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RESEARCH AND DEVELOPMENT TECHNICAL REPORT
ASL-DR-0001

ATMOSPHERIC CONDITIONS AT THE HIGH ENERGY LASER SYSTEMS TEST FACILITY (HELSTF), WHITE SANDS MISSILE RANGE (WSMR), NEW MEXICO

24 MARCH TO 8 APRIL 1977

DATA REPORT
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January 1978

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A set of atmospheric surface, tower, rawinsonde, and aircraft measurements was made at the High Energy Laser Systems Test Facility area from 24 March through 8 April 1977 in support of adaptive optics design for the Navy High Energy Laser Project Manager. These measurements consisted of optical turbulence, wind, water vapor, particulate size distribution, inversion height, air and soil surface temperature, and net radiation. Presented in this data report are plots and selected tabular listings of the surface, tower, and rawinsonde data. The aircraft measurements of optical turbulence are included in an appendix.

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PREFACE

The authors wish to thank Adela Soto for her assistance in assembling these data and Bobby D. Hinds for his helpful suggestions during the preparation of this report.

CONTENTS

INTRODUCTION

In a letter dated 7 February 1977 the Naval Sea Systems Command (Captain Skolnick, Project Manager, High Energy Lasers) requested and subsequently funded a meteorological measurement program at the White Sands Missile Range (WSMR) to support adaptive optics design. The program would focus primarily on optical turbulence and would initially encompass an intensive 2-week effort. In addition to turbulence, measurements would be made of wind, temperature, relative humidity, inversion heights, and particulate size distribution.

The initial 2-week period was scheduled for 24 March through 8 April 1977 and involved a combination of aircraft, tower, rawinsonde, acoustic sounder, and "surface" measurements/observations. The aircraft measurements were of the atmospheric structure parameter measure of optical turbulence; these measurements were performed by the Wave Propagation Laboratory, Environmental Research Laboratories, National Oceanic and Atmospheric Administration (NOAA) and are covered in Appendix A.

The remainder of the measurements/observations were conducted by the Atmospheric Sciences Laboratory and involved three sites: Laser Systems Test Center (LSTC), Apache Site, and Arky Site (Fig. 1).

At the LSTC, point measurements of optical turbulence, windspeed and direction, and temperature were made at approximately the 9 and 34 m tower levels; and inversion height was monitored with an acoustic sounder. In addition, measurements were made of water vapor, net radiation, and soil surface temperature and observations were made of cloud cover.

At Apache Site (5.5 km west of the LSTC) point measurements of optical turbulence, windspeed and direction, and temperature were made at approximately the 9 and 33 m tower levels. In addition, radiosondes were released from Apache Site and were scheduled to coincide with the NOAA turbulence flights.

At Arky Site (2.6 km northwest of the LSTC) point measurements were made of the particulate size distribution, relative humidity, and windspeed. Extinction coefficients were computed for spherical particles for wavelengths of 1.06, 3.8, and 10.6 micrometers from the measured size distribution and published values of the complex refractive index.

The purpose of this report is to present the basic data acquired during the 2 weeks. Following brief sections on geology/soils/vegetation, sites, instrumentation, sampling frequency, and data availability, the data are presented. The data are organized on a daily basis by site in graphical form, occasionally supplemented by tabular listings. Included in the daily summaries are synoptic and local weather summaries, data logs (temperature, moisture, clouds, remarks), plots of the atmospheric structure parameter (or optical turbulence, C_N^2), exponential coefficient of the vertical variation of C_N^2, temperature, vertical temperature difference,

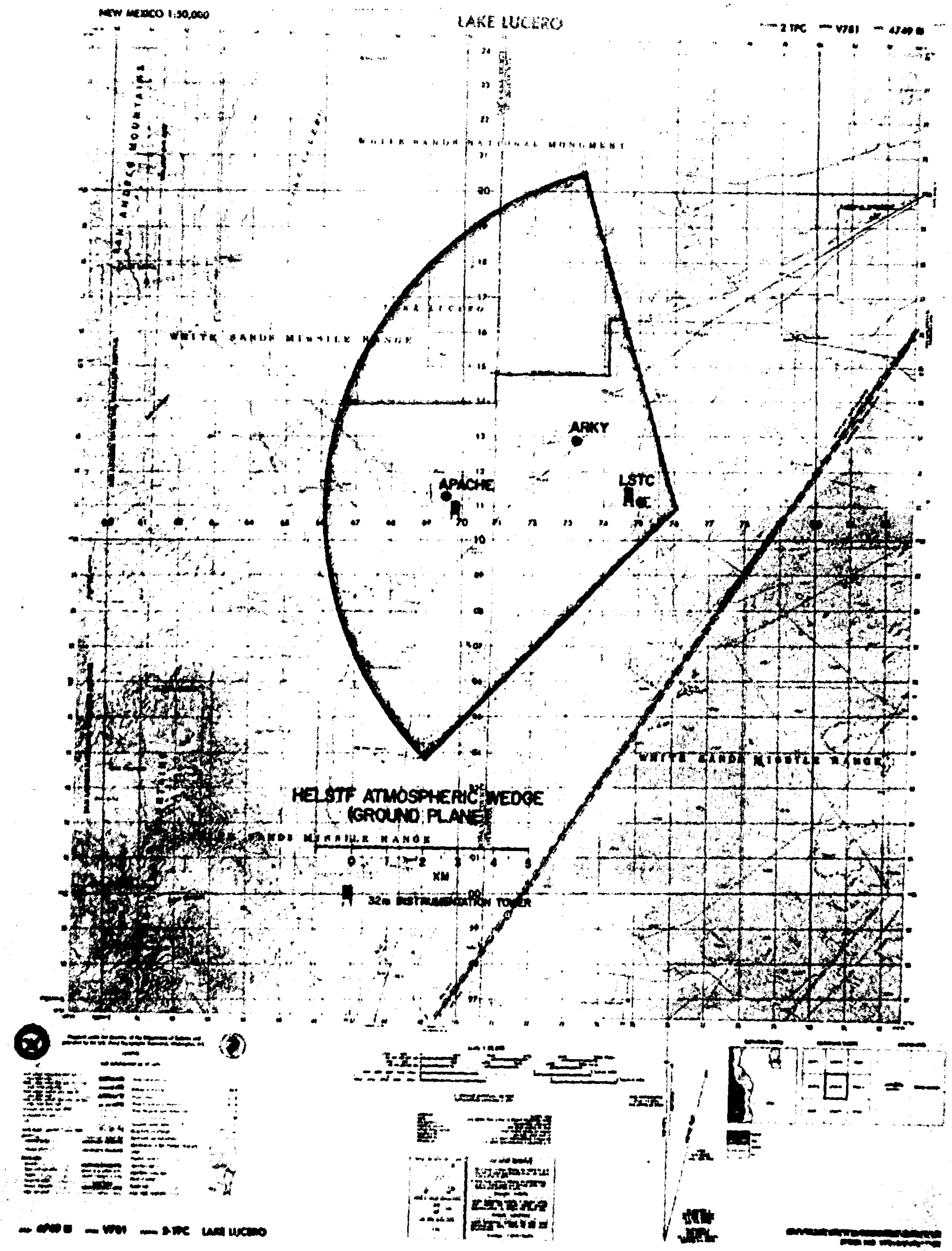

Figure 1. Ground plane projection of the HELSTF atmospheric wedge.

net radiation, windspeed and direction. inversion heights, rawinsonde data, and particulate extinction coefficient estimates for wavelengths of 1.06, 3.8, and 10.6 micrometers together with tabular listings of size distribution, extinction coefficient and mass loading.

Analyses of these data will be covered in a future report.

GEOLOGY/SOILS/VEGETATION

The HELSTF area is located near the southwestern corner of the White Sands National Monument on the White Sands Missile Range in south-central New Mexico. Geologically, the HELSTF area is situated along the western boundary of the Tularosa Basin, a graben capped by bolson deposits (valley fill). Tilted fault block mountains with the upraised fault scarps rising more than 1000 m above the semidesert basin floor dip away from the valley on the west and east sides (San Andres and Sacramento Mountains, respectively). During Pleistocene times a lake covered a large part of the basin. Vestiges of the lake are still evident in the Lake Lucero playa located in the northwestern sector of the HELSTF area. The mantle of bolson deposits is of Cenozoic origin and consists largely of gypsum and quartz sand.

The HELSTF area soils are indicated in Fig. 2. A description of the soil mapping units and the associated vegetative groups is contained in Tables 1 and 2. Lake Lucero is intermittently covered with water, a feature which is dependent upon precipitation over the surrounding area.

SITES

Ground-based measurements were taken at the sites identified as LSTC, Apache, and Arky in Fig. 1. Apache Site is located approximately 5.5 km west of the LSTC and Arky Site about 2.6 km to the northwest. Latitude, longitude, and elevation for the three sites are specified in Table 3.

INSTRUMENTATION

The ground-based instrumentation used to measure optical turbulence, wind, water vapor, particulate size distribution, and ancillary elements are listed in Table 4.

The tower-mounted instrumentation for optical turbulence and wind were located on booms as indicated in Fig. 3. The positioning of the instrumentation at a given level was selected so as to minimize the effects of the towers themselves upon the measurements for the winds expected to occur during the 2-week period. Erroneous data and data influenced by the tower were eliminated from the final computer plots (see Appendix B).

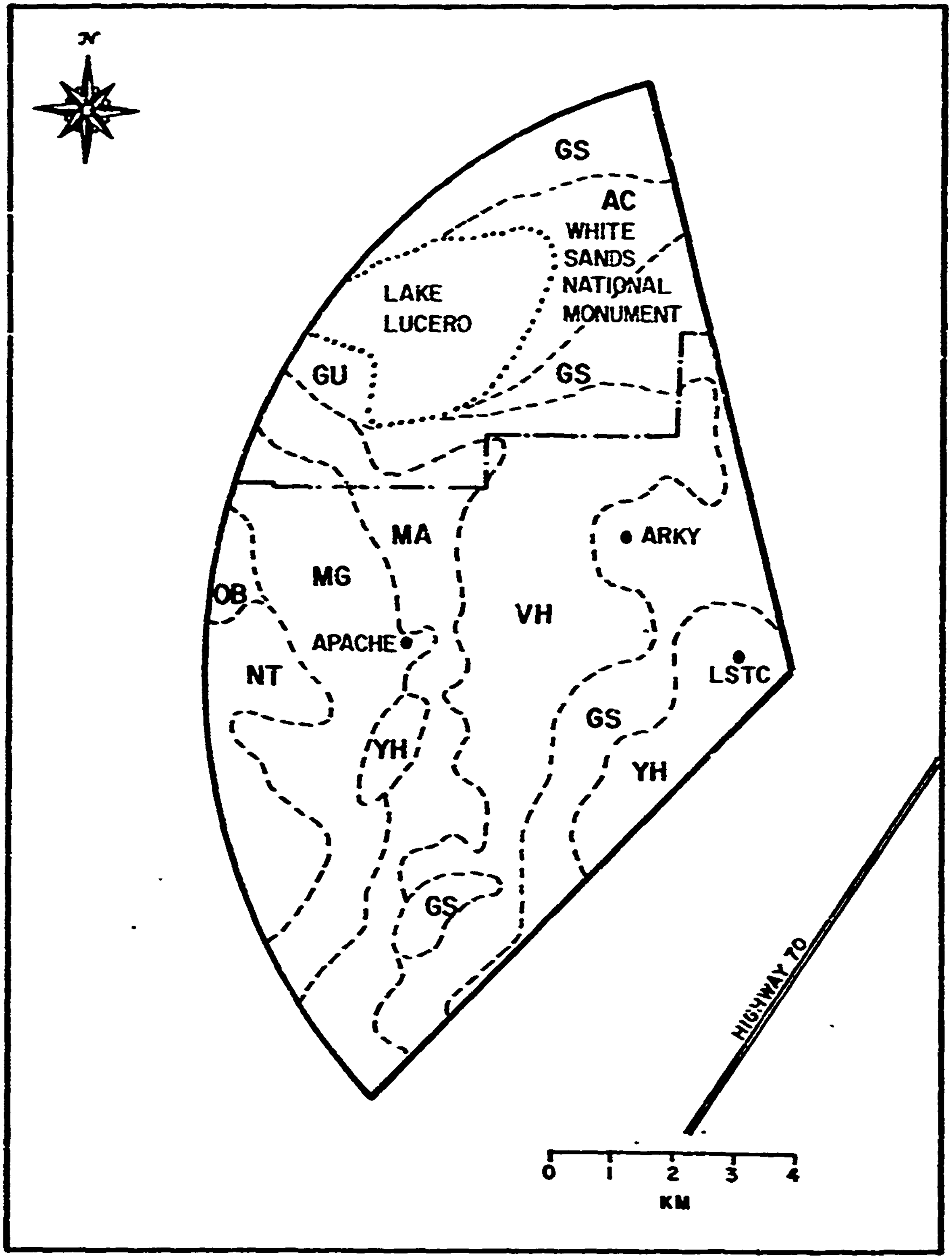

Figure 2. HELSTF area soils (see Table 1 for soil description).

TABLE 1. HELSTF SOILS/VEGETATION*

Map Symbol	Mapping Unit	Description	Vegetative Group*
AC	Active dune land, gypsum	Dunes, 1-30 m high, continually shifted by wind action, gypsum crystals	1
GS	Gypsum land, hummocky	Dunes, gently undulating to rolling gypsum dunes, partly stabilized, little or no soil blowing	2
GU	Gypsum land, level	Level to nearly level gypsum deposits in an old lakebed, water table within 2 m of surface	3
MA	Marcial-Ubar association	55% Marcial silty clay loam, 35% Ubar silt loam, light-brown Ubar occurs higher on landscape than reddish brown Marcial, moderate soil blowing potential	4
MG	Mimbres-Glendale association	55% Mimbres light-brown silt loam, 25% Glendale pale-brown silt loam	5
NT	Nickel-Tencee association	60% Nickel light-brown gravelly fine sandy loam, 25% Tencee brown very gravelly loam, gently to moderate sloping	6
OB	Onite-Bluepoint-Wink association	40% Onite brown loamy fine sand, 25% Bluepoint light-brown fine sand, 20% Wink light-brown loamy fine sand	7
YH	Yesum-Holloman association	35% Yesum very fine sandy loam, 30% Holloman very fine sandy loam, Yesum level to undulating on wind-deposited plains, Holloman level to gently sloping soil in slight depressions and old lake basins	2

*Adapted from: *Neher, R. E. and O. F. Bailey, 1976, "Soil survey of White Sands Missile Range, New Mexico, parts of Dona Ana, Lincoln, Otero, Sierra, and Socorro counties," US Department of Agriculture, US Department of the Army, White Sands Missile Range, and New Mexico Agricultural Experiment Station, 64 pages.*

***See Table 2*

TABLE 2. VEGETATIVE GROUP

Number	Description
1	No vegetation on dunes, but sparse giant dropseed, spike dropseed, Indian rice grass, little bluestem, rubber rabbit brush, chamiza, seepweed, and iodine bush grows between dunes
2	Sparse cover of rough coldenia, gyp grass, Torrey ephedra, alkali sacaton, lichens, chamiza, gyp grama, rubber rabbit brush, Indian rice grass, little bluestem, and mesquite
3	Scattered iodine bush
4	Alkali sacaton, chamiza, iodine bush, inland salt grass
5	Vine mesquite, sacaton, tobosa, fluff grass, burro grass, chamiza
6	Creosote bush, mesquite, American tarbush, mariola panthenium, black grama
7	Mesquite, chamiza, giant dropseed, mesa dropseed, spike dropseed, sand sagebrush, tobosa, black grama, soap tree yucca, alkali sacaton

TABLE 3. DATA ACQUISITION SITES

Site	Latitude	Longitude	Elevation (m above Mean Sea Level)
LSTC	32°38'	106°17'	1210
Apache	32°38'	106°24'	1206
Arky	32°40'	106°20'	1206

TABLE 4. TURBULENCE, WIND, EXTINCTION COEFFICIENT, AND RELATED ANCILLARY MEASUREMENTS

Element Measured	Instrument (Manufacturer & Model No.)	Approx. Height Above Ground (m)	Accuracy
Optical turbulence	In house (see text, p.451)	9, 33	within 15% (C_N^2 $m^{-2/3}$)
Wind (u, v, w)	R. M. Young 27002	9, 33	0.1 m sec^{-1}
Extinction coefficient			
Gas			
Water vapor	Sling Psychrometer ML-24	2	7%
Particulate			
Size distribution	Particle Measuring Systems CSASP-100	5	Under in-house evaluation
Ancillary			
Inversion height	Aerovironment 300	0	50 m
Soil surface temperature	Thermocouple, reference, Acromag 355	-0.001	0.1°C
Net radiation	Teledyne Geotech temperature compensated net exchange radiometer	1	0.1 Langleys min^{-1}
Pressure	Bell & Howell Digital Barometer 4-461-002	2	1 mb
Temperature	Thermocouple, reference, Acromag 355	9, 33	0.1°C
Rawinsonde			
Wind	AN/GMDX-1A, WBRT, 47	0→5000 m	12% (knots)
Temperature	AN/GMD-1A, 2A, 4, WBRT, 47	0→5000 m	1°C
Pressure	AN/GMW-1A, 2A, 4	0→5000 m	0.2% mb
Relative humidity	AN/GMD-1A, 2A, 4, WBRT, 57, µL, 476	0→5000 m	0.2%

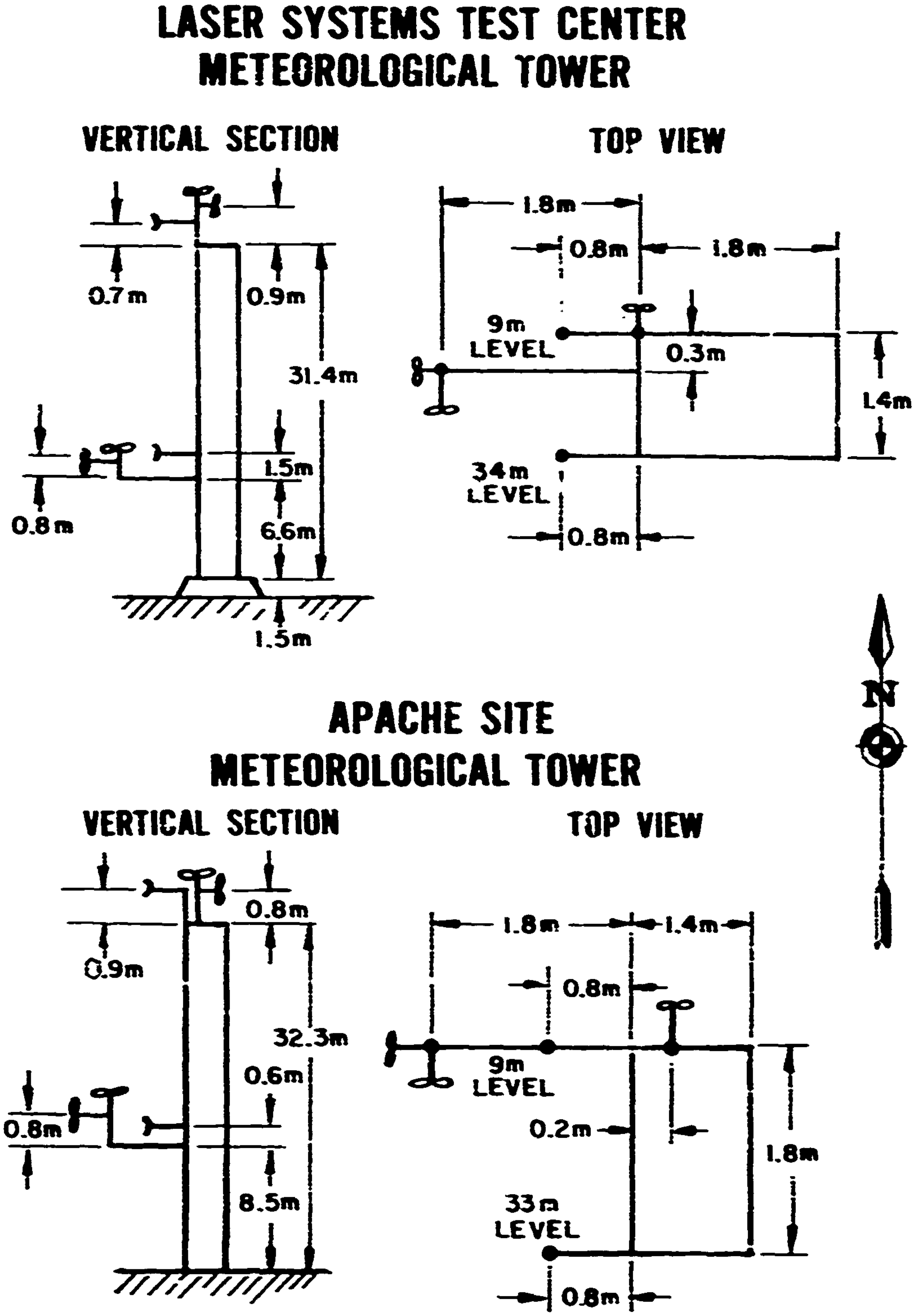

Figure 3. Location of optical turbulence and wind probes on the LSTC and Apache Site meteorological towers.

Turbulence

Optical turbulence, which is characterized by the structure parameter C_N^2, can be quantified by measuring either optical effects or by measuring thermal fluctuations in the atmosphere. Optical measurements are generally restricted to interpretation using a model. When several measurements are to be made at different altitudes, the thermal fluctuation approach is advantageous. Thermal fluctuation measurements, although indirect, are straightforward and are subject to reasonably direct calibration. The turbulence sensors and their calibration are discussed in Appendix C.

Inversion Height

The Aerovironment 300 acoustic sounder data was recorded on a strip chart. The strip chart was manually examined for inversion heights. Up to three inversion heights were identified:

Top of the lowest inversion

Base of the second inversion

Base of the third inversion

These inversion heights were measured at 15-minute intervals and the resultant data computer processed to arrive at the inversion height plots.

Particulate Size Distribution/Extinction Coefficient

A Knollenberg single-particle light scattering counter was used to measure the size distribution of particulates at Arky Site. The advantage of using a light-scattering counter is that the measurement is done in situ in real-time with minimal disturbance to the particles during measurement. A serious shortcoming of the Knollenberg counter is that particle size can be inferred only from the actual measurement of the amount of light scattered into a certain (forward scattering) solid angle by single particles as they pass through a He-Ne laser beam. The amount of light scattered into this particular solid angle depends not only on the particle size, but also on the complex index of refraction and shape of the individual particles. To infer the size distribution[1] used to estimate the extinction coefficients, it is assumed that the particles have a complex refractive index of 1.55-0.005 i [1] at the wavelength of the He-Ne laser (0.6328 micrometer). For a more detailed account of detector calibration, the reader is referred to Pinnick and Stenmark [2].

---

[1] *It is noteworthy that scanning electron microscope measurements of the size distributions of particles collected - simultaneous with the counter measurements - onto filters corroborate the size distribution inferred from the particle counter.*

Extinction coefficients at 1.06, 3.8, and 10.6 micrometers were computed for each size distribution. The computation was based on Mie Theory, assumed spherical particles, and incorporated the complex indices of refraction listed in Table 5. Size distributions and extinction coefficients corresponding to mass loadings of less than 50μg m^{-3} are not statistically significant. The nonlinear size ranges and mean radius corresponding to the Knollenberg particle counter channel number are listed in Table 6.

In support of the particulate size distribution measurements and extinction coefficient estimates, simultaneous measurements of windspeed and relative humidity were made.

For the results presented here the particulates have been modeled with a polydispersion of homogeneous spheres of uniform composition. However, analysis of dust filter samples has revealed that the particulates are multicomponent and have irregular shapes. A model for these effects is under development. In addition, a source strength model is to be developed for the soil-derived component taking into account sedimentation and diffusion.

SAMPLING FREQUENCY

The sampling frequencies of the various elements are listed in Table 7.

DATA AVAILABILITY

Ground Based

Table 8 contains a summary of the measurements/observations scheduled for each of the three sites.

The actual availability of the data is summarized in Tables 9, 10, and 11. Hazardous atmospheric conditions (generally high windspeeds and the attendant blowing dust and sand) and instrumentation difficulties account for most of the missing data, in particular on 28 and 29 March.

Airborne

The availability of data from the NOAA turbulence flights is summarized in Table 12. The actual data, as previously indicated, are reported in Appendix A.

DATA

The data are summarized, either graphically or in tabular form, on a daily basis. Included in the summaries are:

TABLE 5. COMPLEX INDICES OF REFRACTION USED TO CALCULATE EXTINCTION COEFFICIENT

Index of Refraction	Wavelength (μm)	Reference
1.65-0.0050i	1.06	3
1.47-0.0045i	3.8	4
1.70-0.3000i	10.6	5

TABLE 6. SIZE RANGES AND MEAN RADIUS CORRESPONDING TO KNOLLENBERG PARTICLE COUNTER CHANNEL NUMBER

Channel Number	Radius Range (μm)	Mean Radius (μm)
1	0.32 - 0.89	0.61
2	0.89 - 1.48	1.19
3	1.48 - 2.11	1.80
4	2.11 - 4.4	3.26
5	4.4 - 5.5	4.95
6	5.5 - 9.6	7.55
7	9.6 - 10.6	10.1
8	10.6 - 24.7	17.7

TABLE 7. SAMPLING FREQUENCIES FOR THE ASL ATMOSPHERIC DATA

24 March - 8 April 1977

Element	Sampling Frequency
Turbulence	Analog RMS 10 seconds average and arithmeticallly averaged over 15 minutes
Wind	
LSTC and Apache	Once every 10 seconds and arithmetically averaged over 15 minutes
Arky	Two second arithmetic average every 10-15 minutes
Moisture	
LSTC and Apache	Once every hour
Arky	Once every 15 minutes
Temperature	Once every 10 seconds and arithmetically averaged over 15 minutes
Net radiation	Once every 10 seconds and arithmetically averaged over 15 minutes
Cloud observations	Once every hour
Size distribution	Cumulative over 10-15 minutes
Inversion height	Every 18 seconds
Rawinsonde	0000, 0600, 1200, 1800 hours MST

TABLE 8. SCHEDULED SITE MEASUREMENTS/OBSERVATIONS

LSTC	APACHE	ARKY
Optical turbulence[1]	Optical turbulence[1]	
8 m	9 m	
34 m	33 m	
Wind[1]	Wind[1]	Wind[1]
8 m	9 m	
34 m	33 m	
Temperature[1]	Temperature[1]	
9 m	9 m	
34 m	33 m	
		Particulate size distribution[4]
	Rawinsonde[3]	
Water vapor pressure[2]		Relative humidity[1]
Net radiation[2]		
Cloud cover[2]		
Inversion height[1]		

[1] Continuous

[2] Hourly

[3] 0000, 0500, 1200, and 1800 MST

[4] Generally 10-15 minutes

TABLE 9

DATA AVAILABILITY
TURBULENCE, WIND, TEMPERATURE, VAPOR PRESSURE, NET RADIATION, CLOUD COVER and INVERSION HEIGHTS

Date		Turbulence				Wind Speed & Direction (9m and 33m)		Temperature (9m and 33m)		Vapor Pressure	Net Radiation	Cloud Cover	Inversion Heights
		9m		33m									
		L	A	L	A	L	A	L	A	L	L	L	L
March	24	P	N	P	N	C	C	C	C	C	C	C	C
	25	P	P	P	P	C	P	C	P	C	C	C	C
	26	P	N	N	N	P	N	P	N	P	P	C	C
	27	P	N	N	N	P	N	P	N	P	P	P	P
	28	N	N	N	N	N	N	N	N	N	N	N	N
	29	N	N	N	N	N	N	N	N	N	N	N	N
	30	P	P	P	P	P	P	P	P	P	P	P	P
	31	P	P	P	N	C	C	C	C	C	C	C	C
April	1	P	P	P	P	C	C	C	C	C	C	C	C
	2	P	P	P	P	C	C	C	C	C	C	C	C
	3	C	P	P	P	C	P	C	P	C	C	C	C
	4	P	P	P	P	C	C	C	P	C	C	C	C
	5	P	P	P	P	C	C	C	C	C	C	C	C
	6	P	P	P	P	C	C	P	C	C	C	C	C
	7	P	P	P	P	C	P	C	P	C	C	C	C
	8	P	P	P	P	P	C	P	C	P	P	C	C

L = LSTC   C = Complete Data Set   N = No Data

A = Apache   P = Partial Data Set

TABLE 10. APACHE RADIOSONDE DATA AVAILABILITY
(Release Numbers)

Date	Release Times (MST)			
	0000	0500	1200	1800
March 24		1	2	3
25	4	5	6*	7
26	8	9	10	11**
27	**	**	12	13
28	**	**	**	**
29	**	14***	15	16
30	17	18	19	20
31	21	22	23	24
April 1	25	26	27	28
2	29	30	31	32
3	33	34	35	36
4	37	38	39	40
5	41	42	43	44
6	45	46	47	48
7	49	50	51	52
8	53	54	55	56
9	57			

**Released at 1000 MST*

***Canceled due to inclement weather*

****Missing*

TABLE 11. ARKY PARTICULATE SIZE DISTRIBUTION DATA AVAILABILITY

Date	Hours (MST)
March 24	C
25	0000-1515
26	1800-2400
27	C
28	C
29	C
30	C
31	C
April 1	C
2	C
3	0000-2342
4	N
5	N
6	1525-2400
7	0000-1755
8	N

C = Complete data set

N = No data

Weather Summary

0500 MST surface weather map and station weather

0500 MST 500-mb height contours

Holloman AFB cloud, wind, visibility, temperature, and vapor pressure summary

LSTC

C_N^2 at 9 and 34 m

Exponential coefficient reflecting altitude change of C_N^2 between 9 and 34 m

Temperature and vapor pressure

Differential temperature (soil and 9 m, soil and 34 m) and net radiation

Windspeed and direction at 8 and 34 m

Apache

C_N^2 at 9 and 33 m

Exponential coefficient reflecting altitude change of C_N^2 between 9 and 33 m

Temperature (air at 9 and 33 m) and vapor pressure

Windspeed and direction at 9 and 33 m

Rawinsonde

Temperature, vapor pressure, and wind with corresponding tabular listing for significant and mandatory levels up to 3600 m above ground level (AGL)

Particulate

Size distribution (tabular)

Extinction coefficient estimates (graphical and tabular)

Windspeed and relative humidity (graphical)

(Additional size distribution data, extinction coefficient estimates, and windspeed and relative humidity data are available for 16, 17, 18, 19 and 23 March. The respective plots and tabular listings are included in Appendix D)

Mass loading (tabular)

REFERENCES

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5. Patterson, E., 1977, "Atmospheric Extinction Between 0.55μm and 10.6μm Due to Soil-Derived Aerosols," Appl. Opt., 16:2414-2418.

Weather Summary

Date: 24 March 1977

Synoptic

Surface: Deep surface low-pressure area over eastern Montana with secondary low over Utah. Cold front extending from the low over eastern Montana into southern California.

500 Millibar: Upper air trough off the west coast with short wave over western Texas and resultant northwesterly flow over New Mexico.

Holloman AFB

Clouds: Mostly clear with scattered afternoon high clouds (cirrus).

Wind: Light and variable in the morning with 5-9 m sec^{-1} southerly winds during the afternoon.

Visibility: Generally greater than 60 km.

Maximum temperature: 23.9°C Corresponding vapor pressure: 2.5 Torr

Minimum temperature: 7.2°C Corresponding vapor pressure: 2.2 Torr

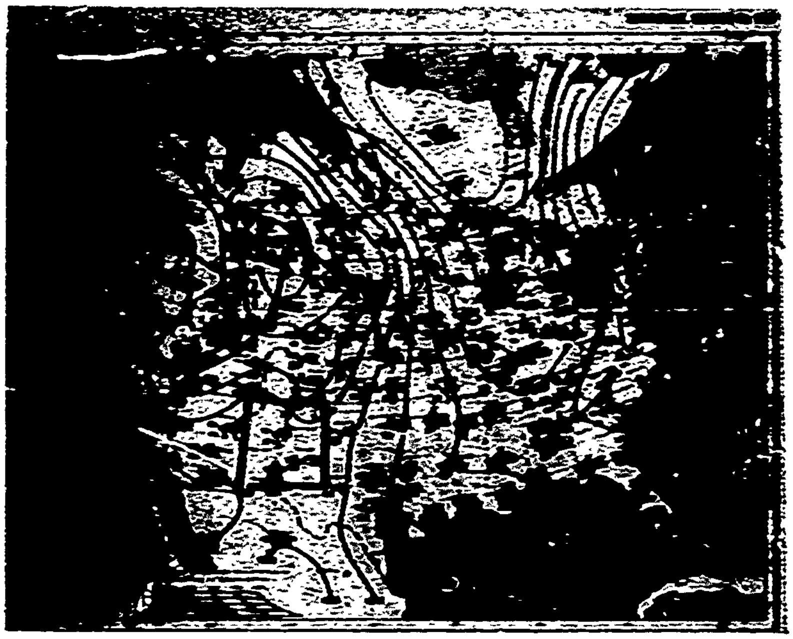


Figure 4a. Surface weather map for 24 March 1977.

Figure 4b. 500-millibar height contours for 24 March 1977.

TABLE 13. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

				Clouds			Date: 24 March 1977
Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Low %/Type	Mid %/Type	High %/Type	Remarks
0100	13.8	3.8	-1.8	0	0	0	
0200	12.9	4.2	-0.6	0	0	0	
0300	7.3	3.3	-4.1	0	0	0	
0400	4.3	2.8	-6.1	0	0	0	
0500	3.0	2.5	-7.2	0	0	0	
0600	2.8	2.3	-8.2	0	0	0	
0700	4.0	2.7	-6.7	0	0	0	
0800	9.0	3.2	-4.4	0	0	0	
0900	15.3	4.0	-1.2	0	0	0	
1000	17.6	5.0	1.7	0	0	0	Acoustic sounder placed in operation at 0945
1100	17.7	5.5	2.9	0	0	0	
1200	21.2	4.5	0.6	0	0	0	
1300	21.3	5.5	3.1	0	0	0	
1400	21.8	5.2	2.5	0	0	0	
1500	23.0	6.8	6.0	0	0	0	
1600	22.4	4.2	-0.3	0	0	0	
1700	22.3	5.8	3.9	0	0	10 Ci	
1800	20.2	5.3	2.6	0	0	10 Ci	Checked acoustic sounder
1900	16.0	3.3	-3.5	0	0	10 Ci	
2000	12.3	3.9	-1.6	0	0	10 Ci	
2100	12.1	3.8	-2.2	0	0	10 Ci	
2200	9.8	3.4	-3.6	0	0	10 Ci	
2300	8.1	2.9	-5.5	0	0	10 Ci	
2400	10.7	3.4	-3.5	0	0	10 Ci	

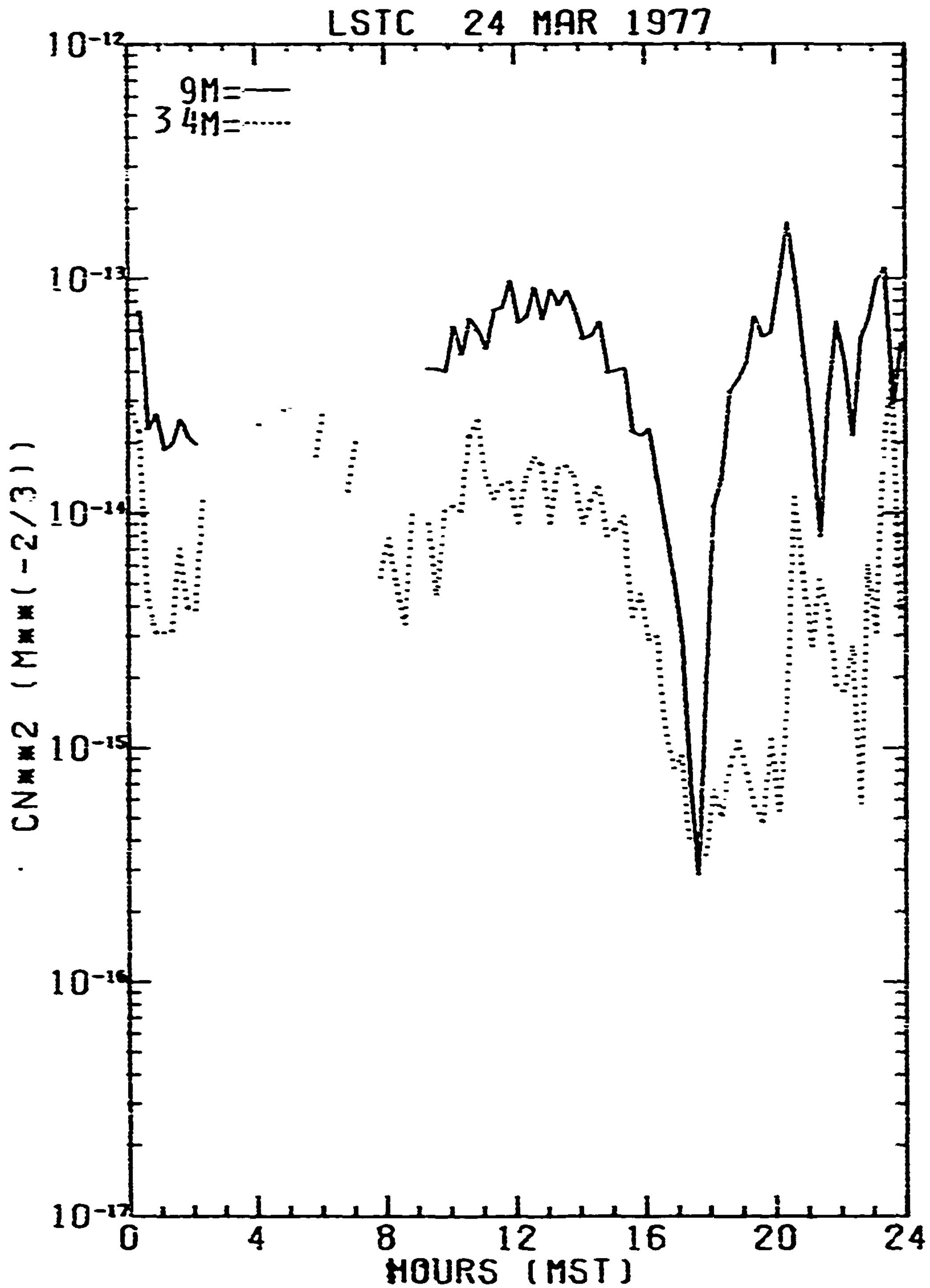


Figure 5. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 24 March 1977.

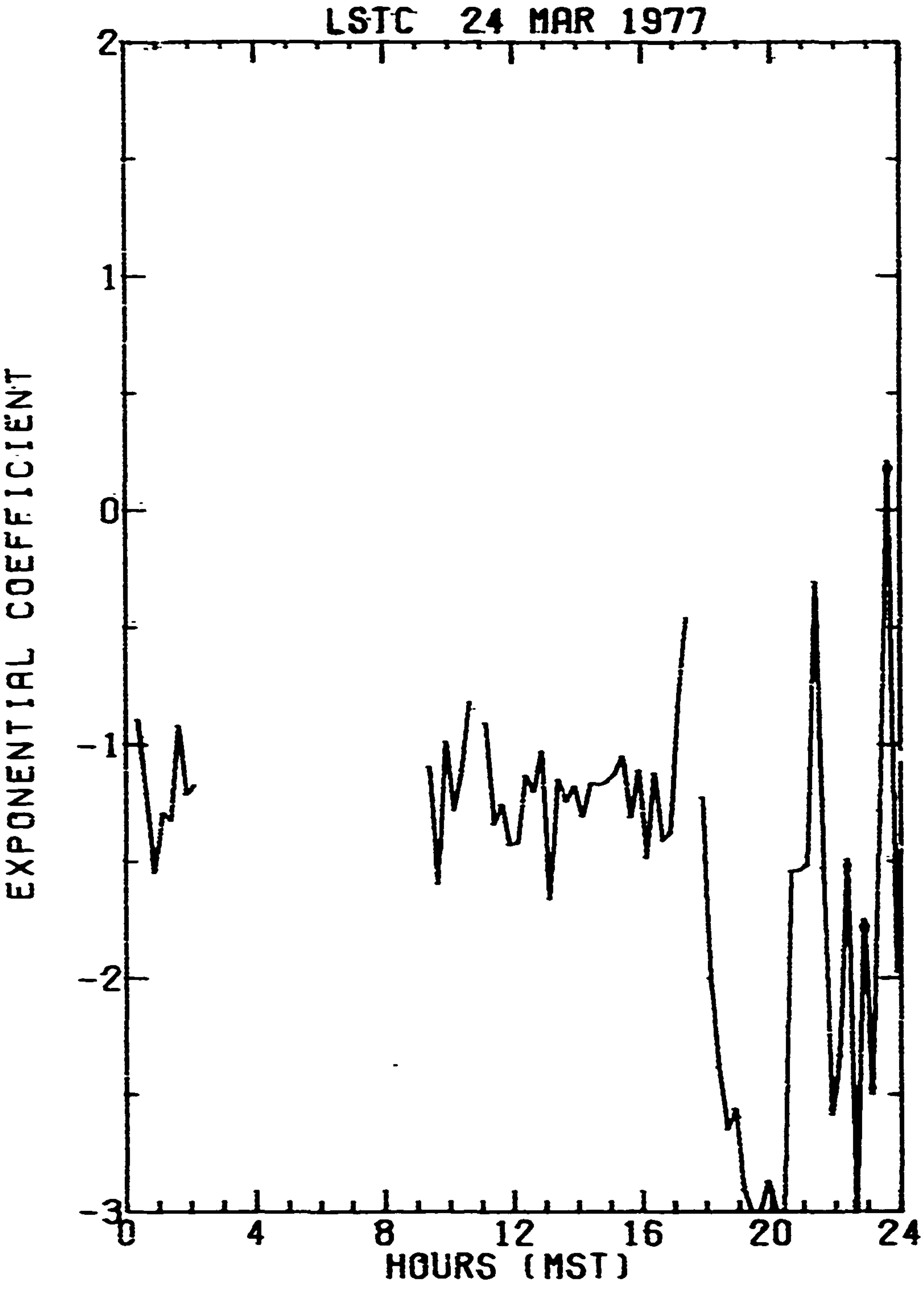


Figure 6. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 24 March 1977.

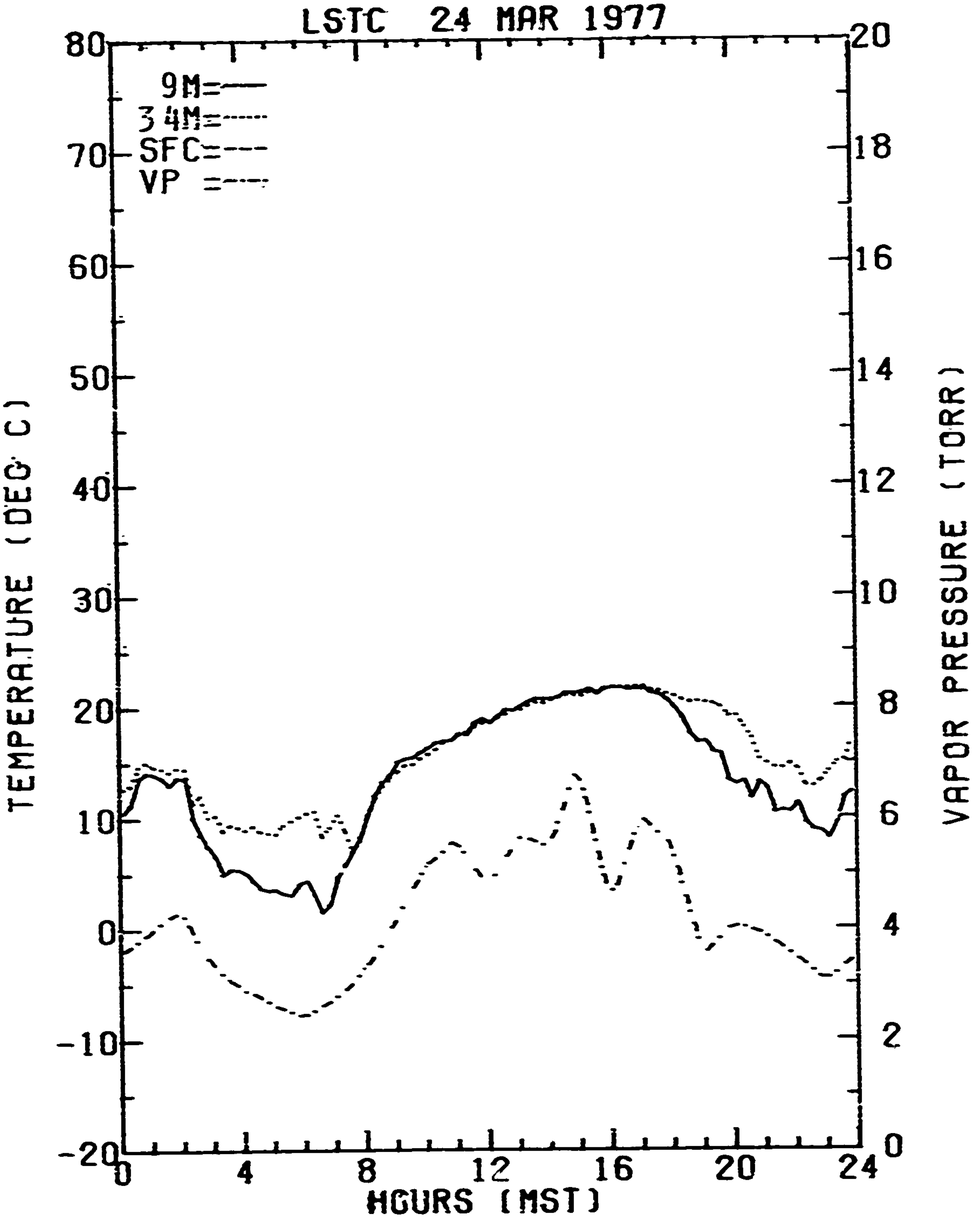


Figure 7. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 24 March 1977.

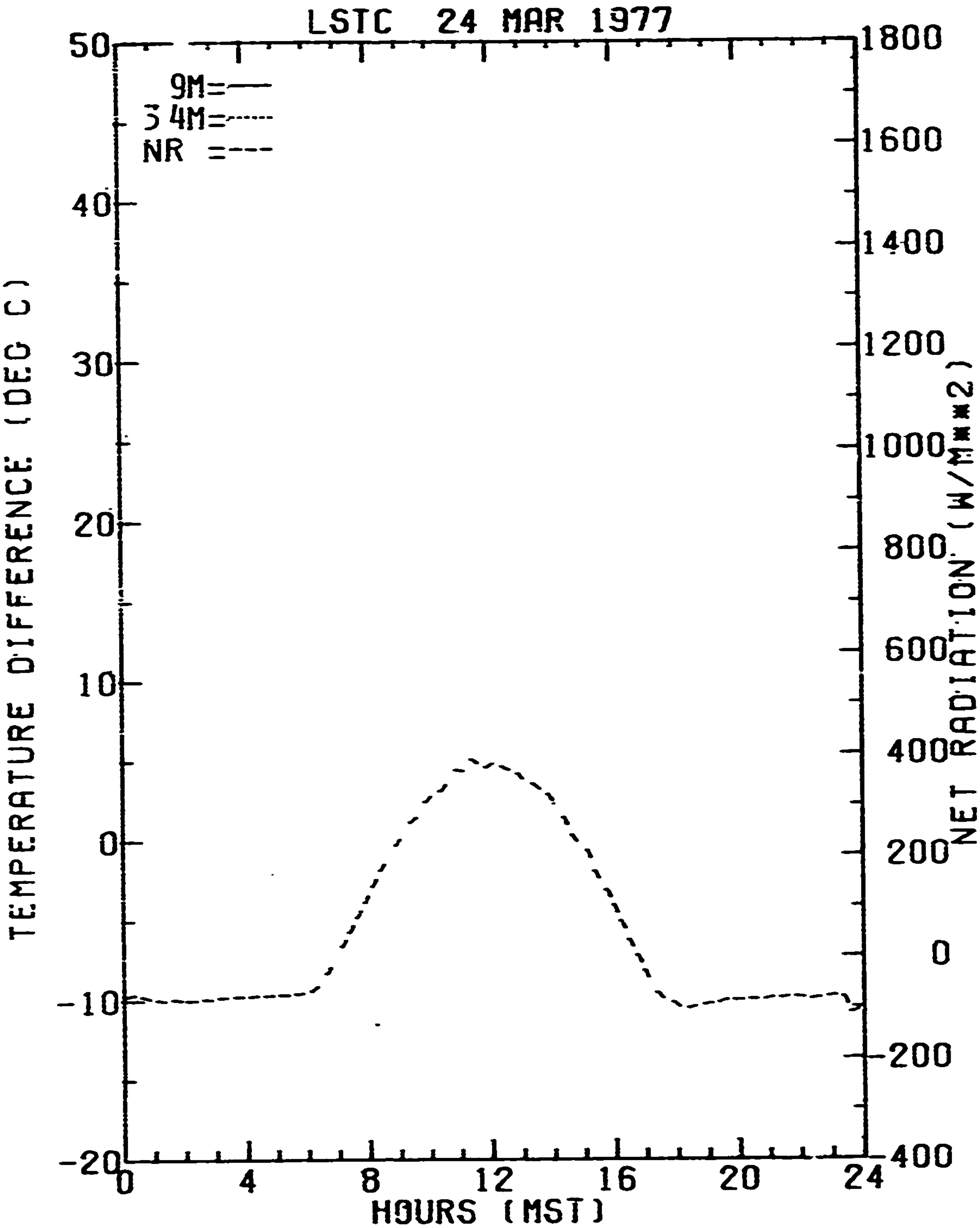


Figure 8. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 24 March 1977.

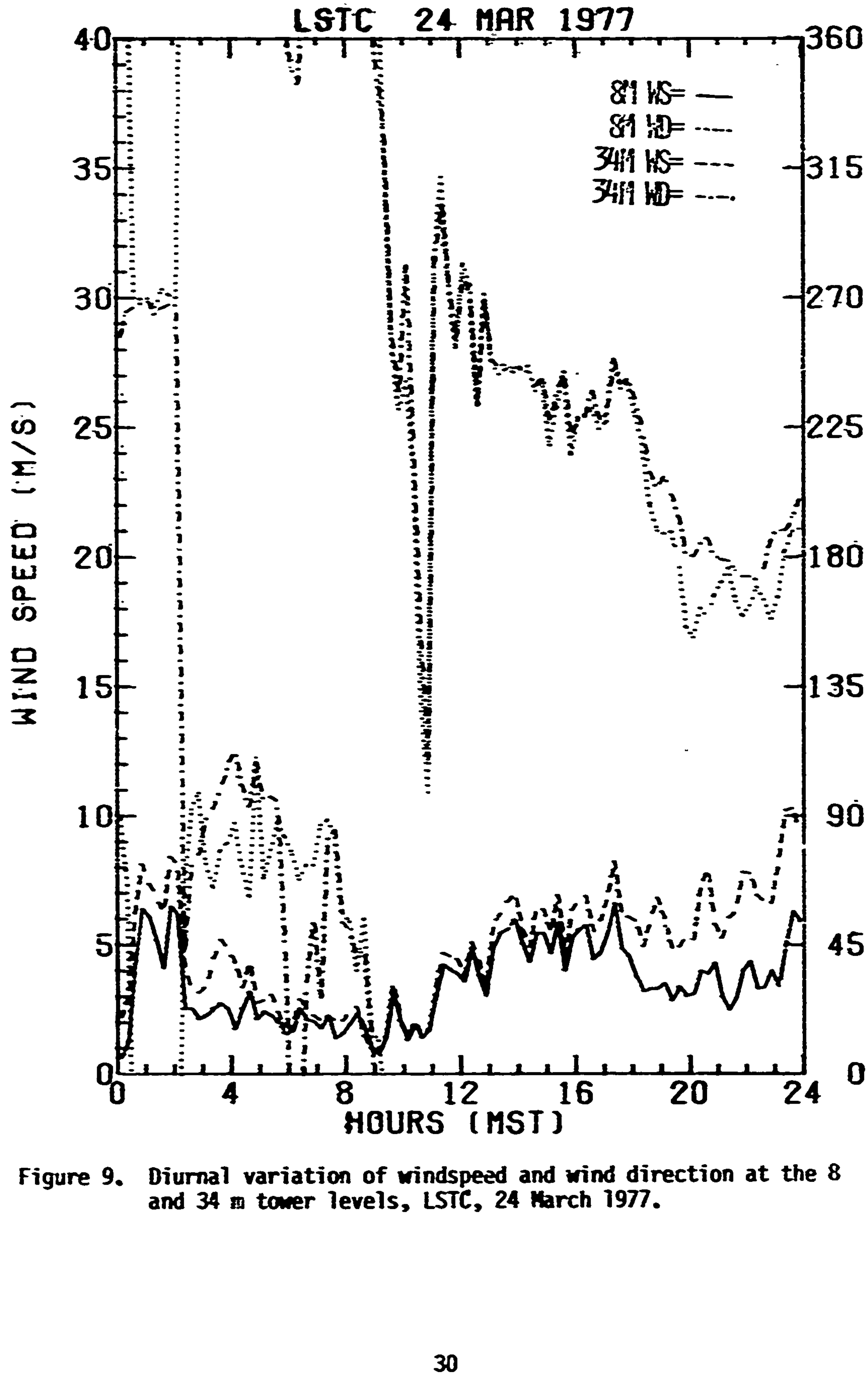


Figure 9. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 24 March 1977.

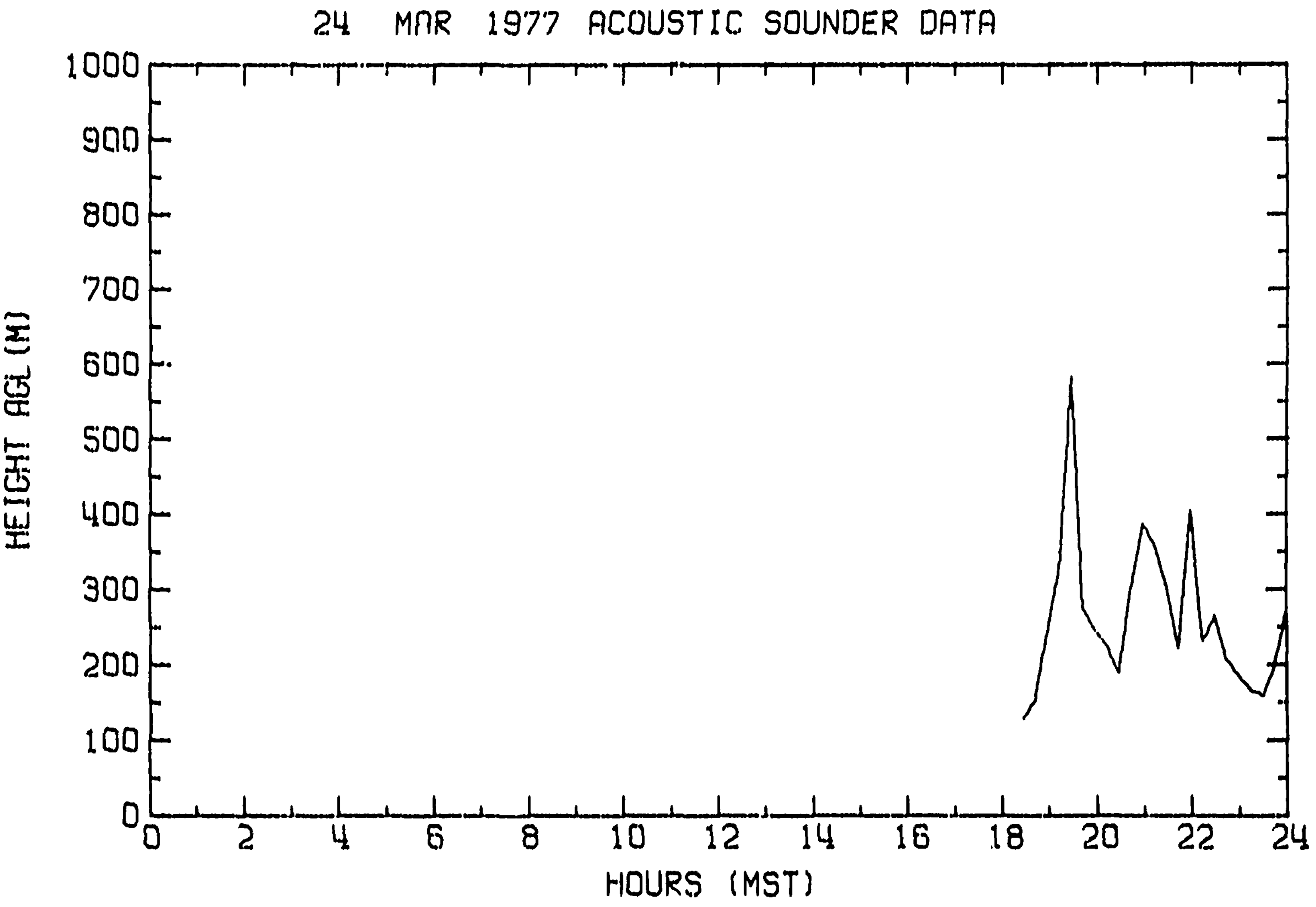


Figure 10. Inversion heights, LSTC, 24 March 1977.

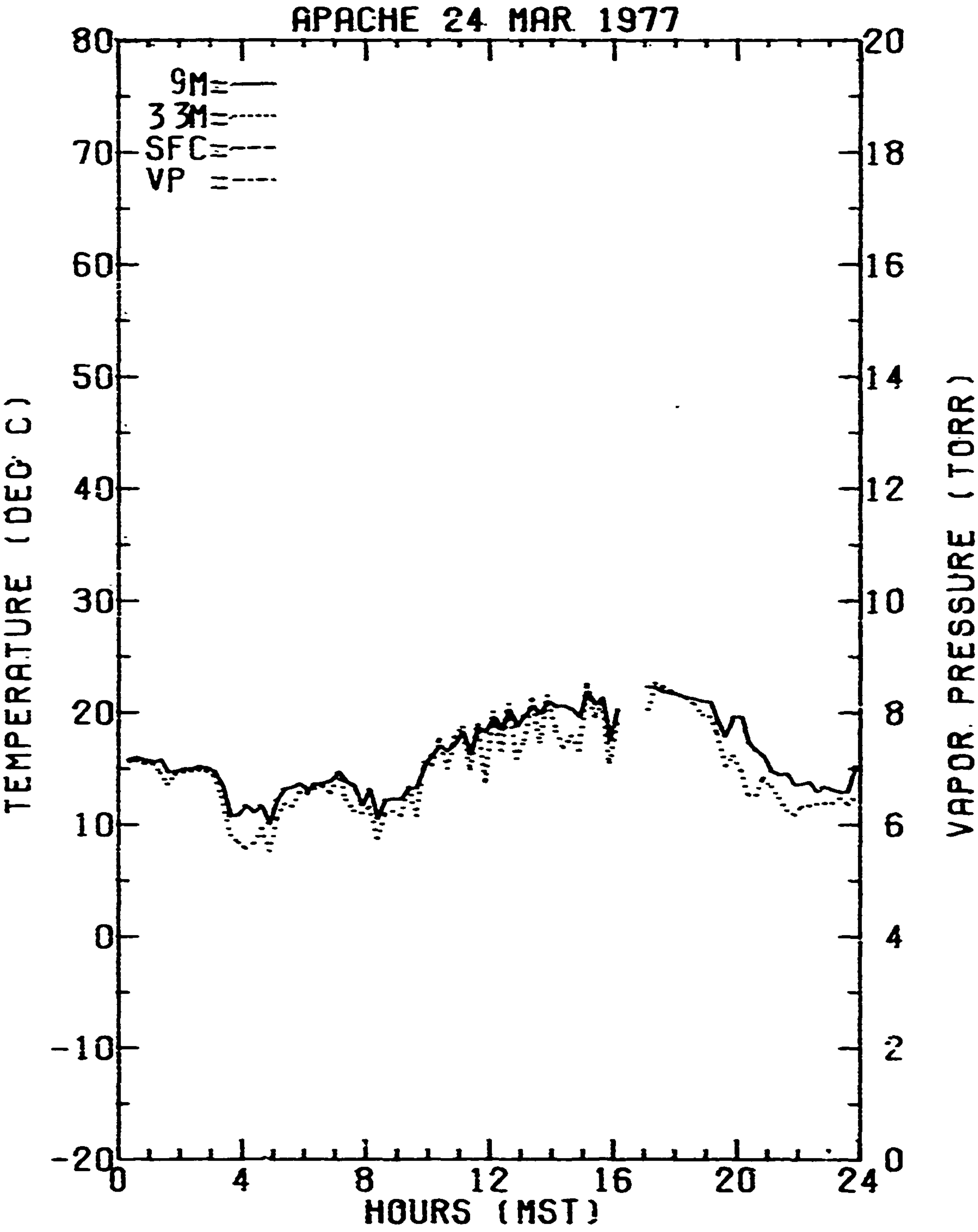


Figure 11. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 24 March 1977.

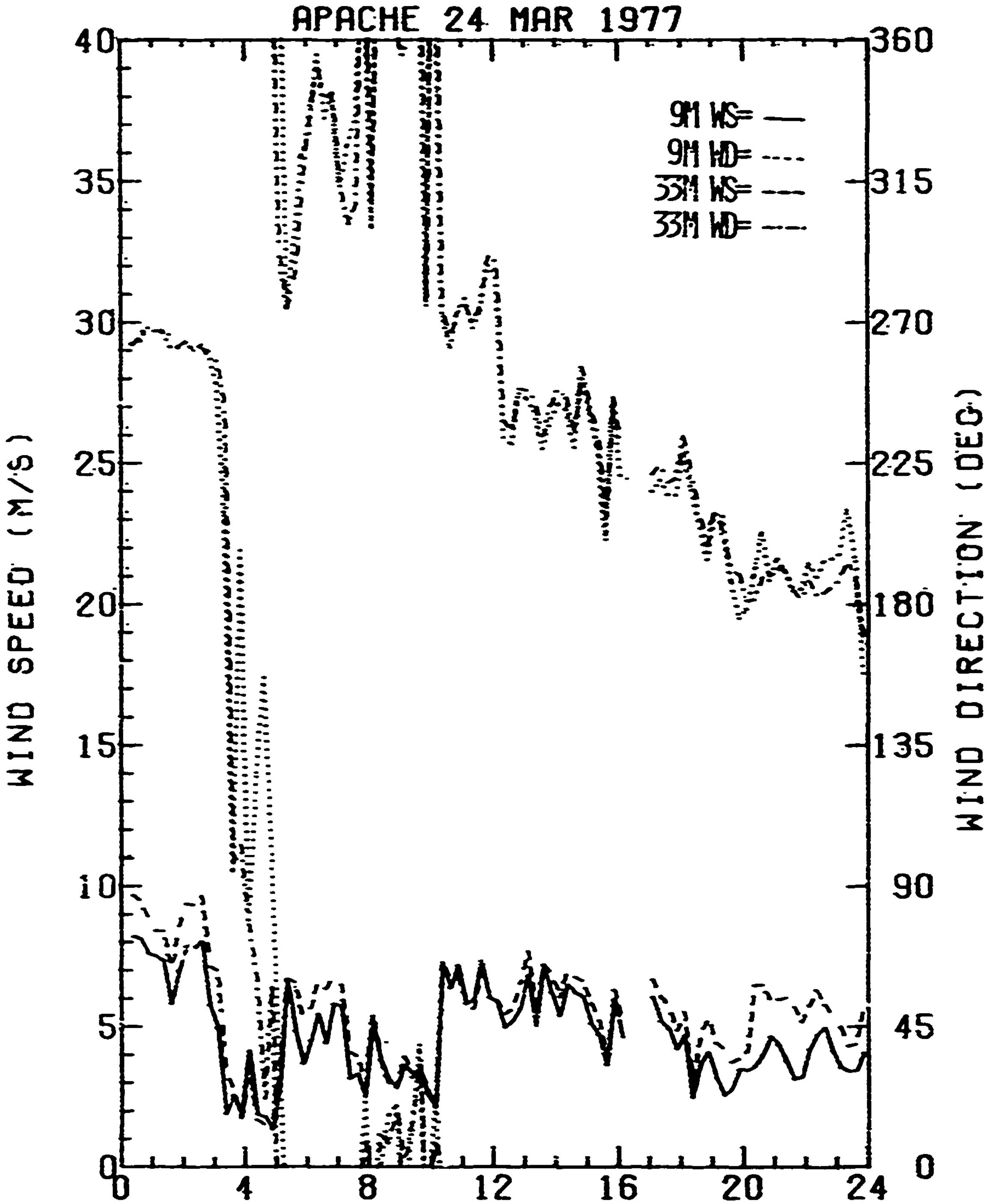


Figure 12. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels. Apache Site, 24 March 1977.

TABLE 14
APACHE SITE RAWINSONDE DATA

DATE: 24 MAR 77 RELEASE NO. 1 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	657.4	8.0	2.7	270.0	6.2
57.3	652.9	14.2	2.3	269.6	6.6
258.9	637.5	13.0	2.2	268.3	8.4
972.0	585.0	6.0	1.7	261.3	10.8
1318.5	560.7	4.1	1.5	253.9	6.9
1849.7	525.0	-.4	1.4	256.4	5.1
2919.0	458.8	-5.0	0.5	286.8	12.5
3599.5	420.6	-8.6	0.4	300.8	16.0

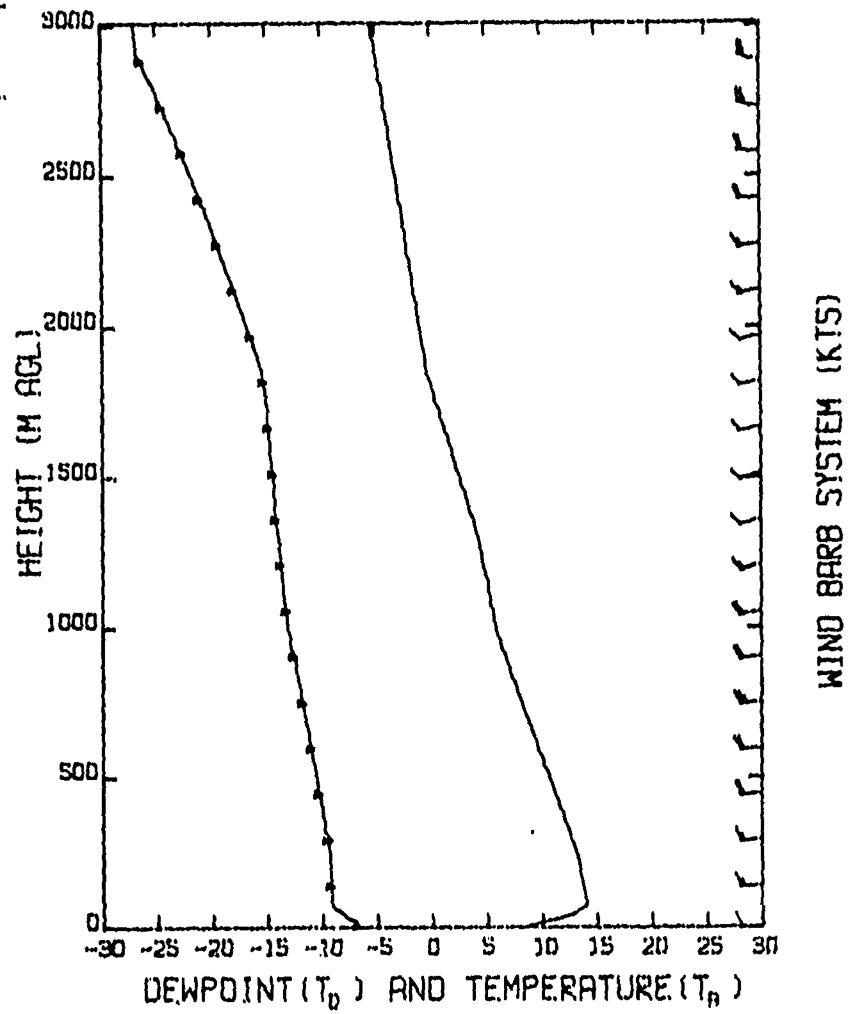


TABLE 15
APACHE SITE RAWINSONDE DATA

DATE: 24 MAR 77 RELEASE NO.: 2 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	656.5	20.9	2.0	230.0	5.1
252.3	637.5	16.5	2.2	0.0	0.0
1309.4	561.7	6.5	1.8	257.2	4.4
1860.9	525.0	2.4	1.2	275.6	6.2
1949.2	519.3	3.0	1.1	274.5	6.5
2404.8	490.8	0.5	0.9	262.9	6.9
3093.7	450.1	-4.0	0.7	254.3	10.1

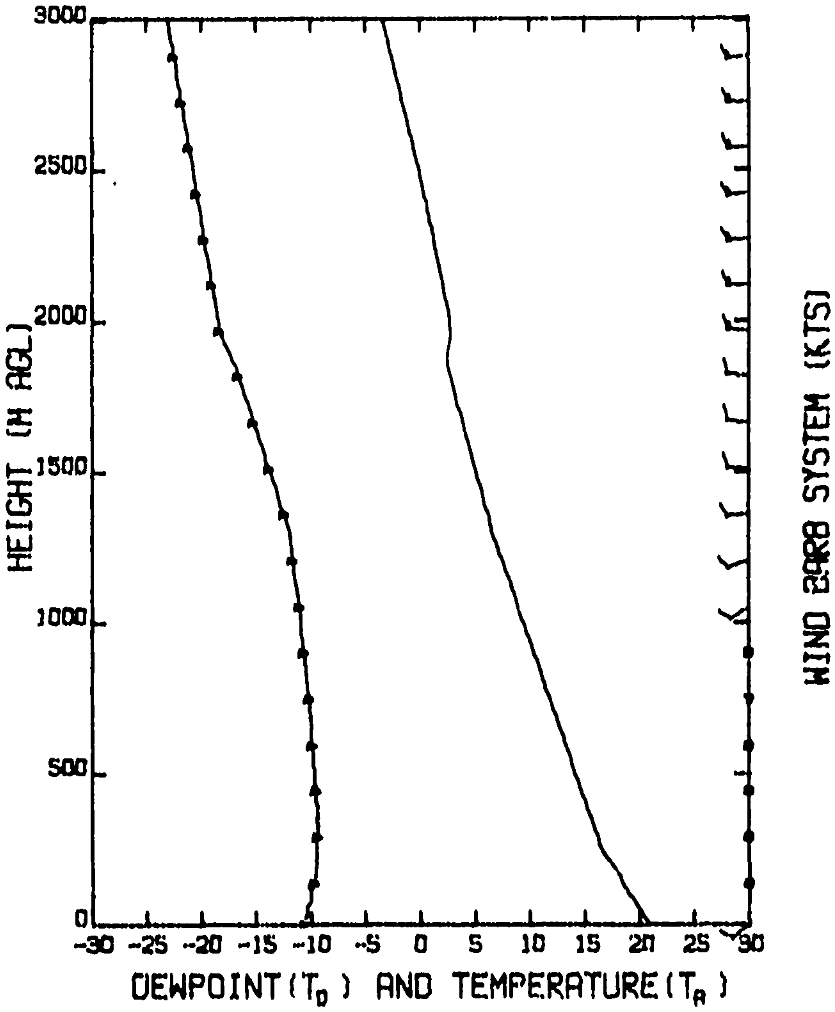


TABLE 16
APACHE SITE RAWINSONDE DATA

DATE: 24 MAR 77 RELEASE NO.: 3 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.0	20.5	1.8	220.0	5.1
107.5	646.9	21.7	3.5	220.6	5.3
234.6	637.5	20.2	3.2	221.3	5.4
318.1	631.3	19.7	3.8	221.8	5.5
382.6	626.6	18.0	2.6	222.2	5.6
1855.7	525.0	2.8	1.5	252.3	8.9
4076.7	395.8	-13.2	0.3	241.9	13.4

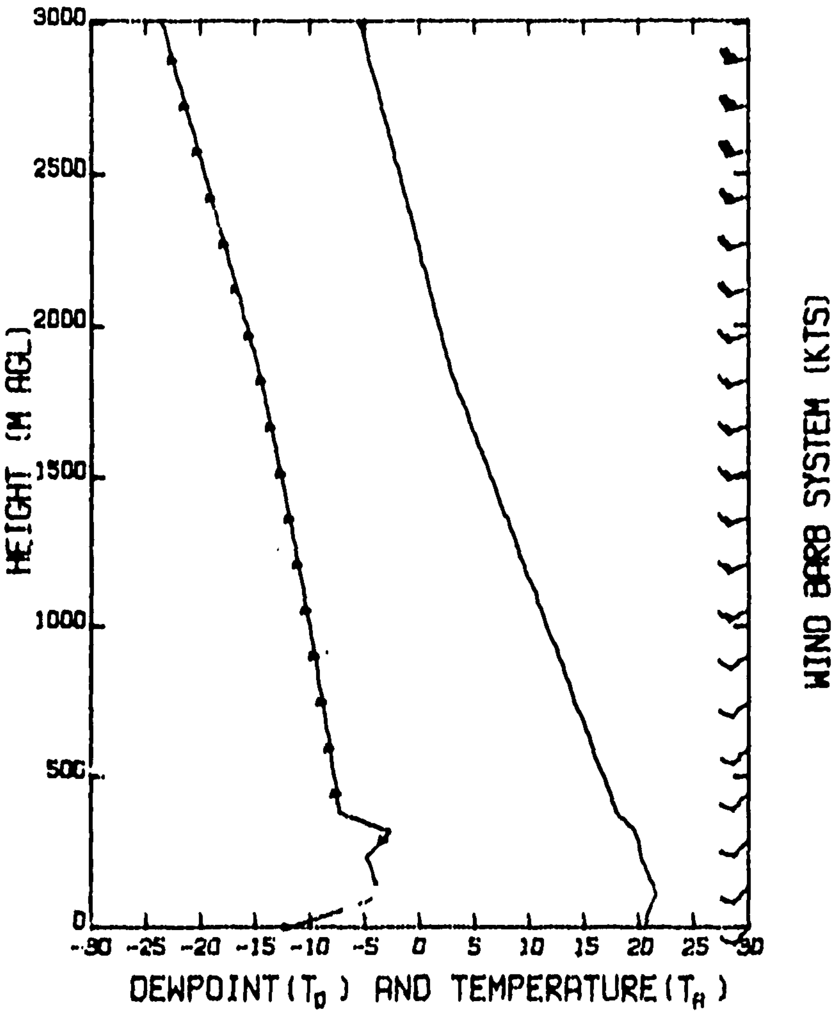
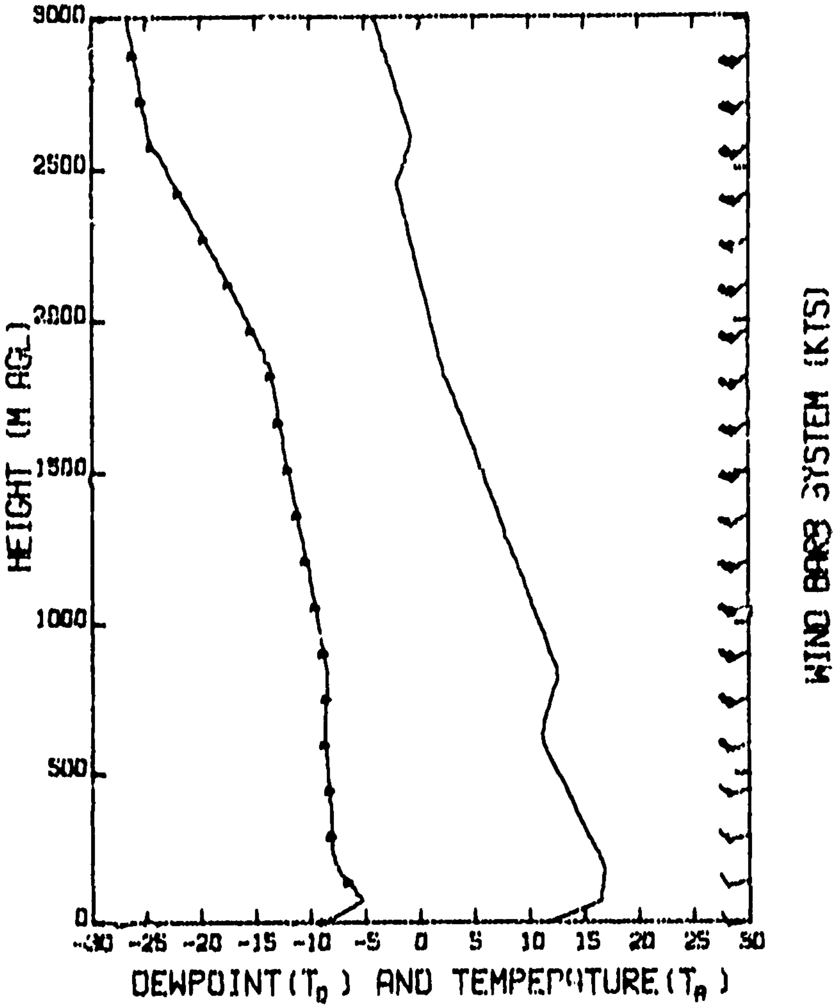


TABLE 17
APACHE SITE RAWINSONDE DATA

DATE: 24 MAR 77 RELEASE NO.: 4 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.3	11.6	2.4	260.0	5.1
74.7	649.5	16.5	3.1	257.7	5.8
179.5	641.5	17.0	2.6	255.6	6.5
233.4	637.5	16.2	2.5	254.4	7.1
616.4	609.1	11.0	2.4	248.5	10.9
820.9	594.4	12.7	2.4	245.3	13.1
1577.3	542.5	4.9	1.8	231.0	12.4
1844.4	525.0	2.0	1.6	230.7	12.4
2451.0	486.7	-2.1	0.7	228.4	13.4
2589.9	478.3	-.6	0.6	228.6	14.3
3357.1	434.1	-7.2	0.4	230.4	17.0



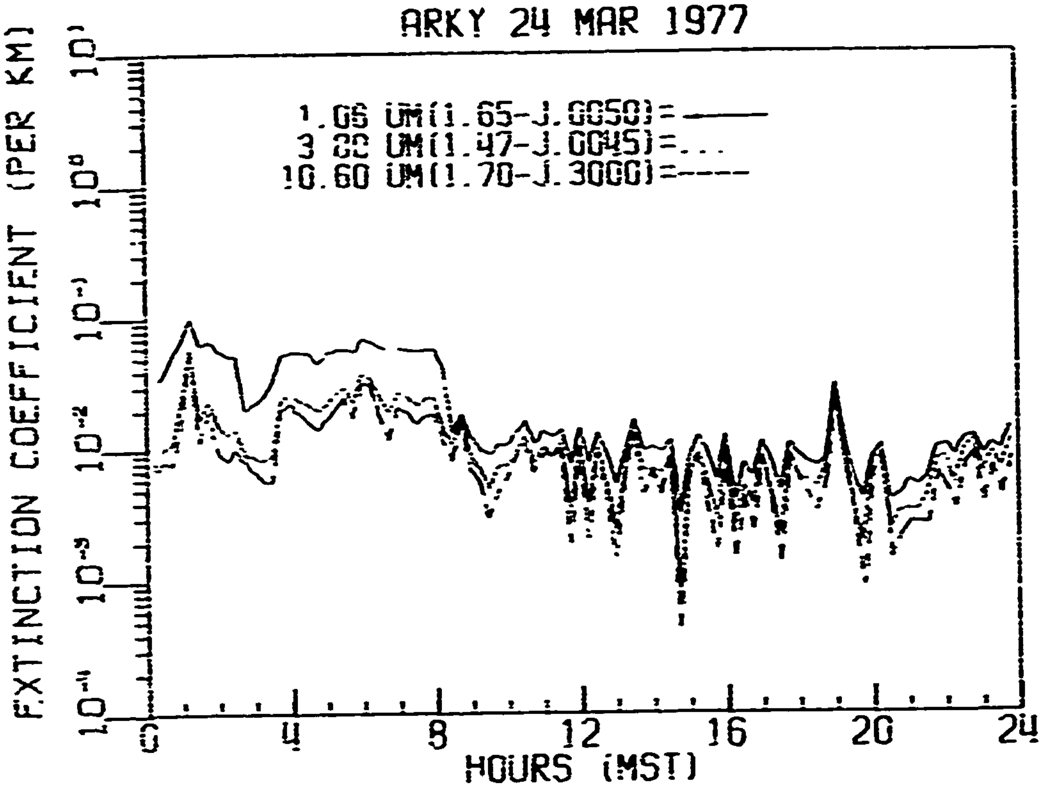


Figure 13. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 24 March 1977.

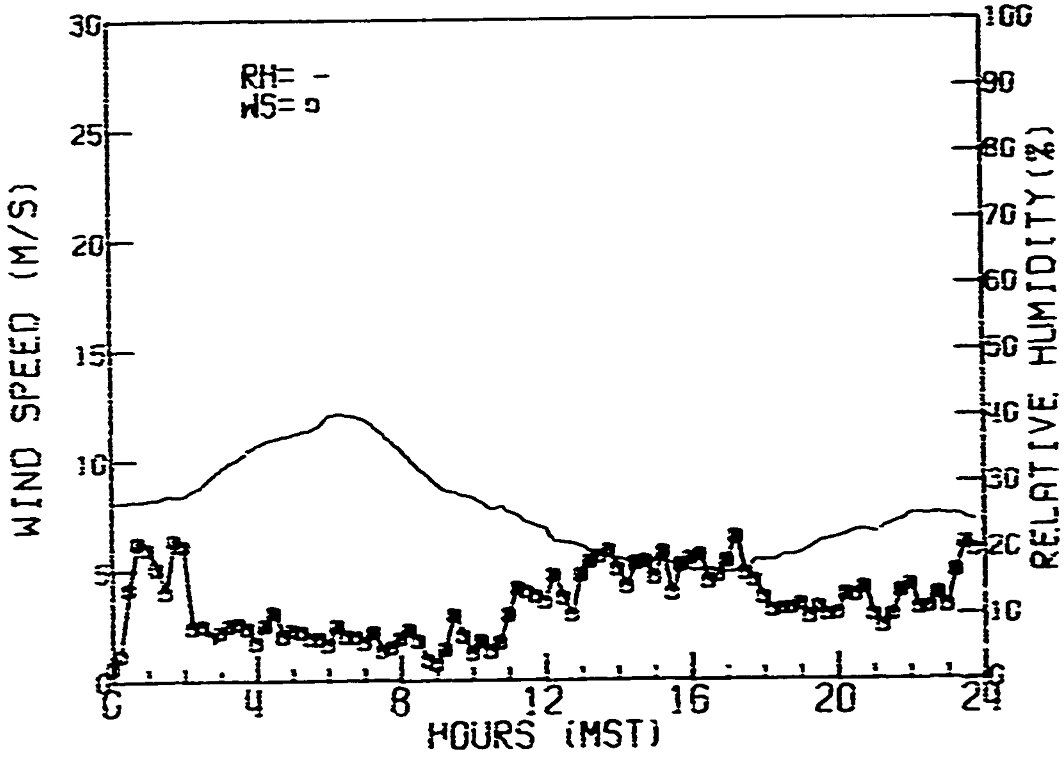


Figure 14. Diurnal variation of windspeed and relative humidity, Arky Site, 24 March 1977.

TABLE 10
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	13.6	MASS LOADING (UG/M**3)
24 MAR 77														
	00:00:00	900	.79+01	.57+00	.81-01	.40-01	.00	.13-01	.00	.00	.37-01	.12-01	.98-02	138.
	00:15:00	900	.63+01	.31+00	.19+00	.10-01	.64-01	.00	.00	.00	.33-01	.81-02	.71-02	67.
	00:30:00	900	.79+01	.33+00	.16+00	.40-01	.32-01	.00	.00	.00	.37-01	.10-01	.80-02	89.
	00:45:00	900	.11+02	.84+00	.19+00	.10-01	.32-01	.00	.00	.00	.52-01	.11-01	.78-02	103.
	01:00:00	900	.13+02	.15+01	.43+00	.10-01	.00	.26-01	.00	.00	.69-01	.22-01	.16-01	229.
	01:15:00	900	.13+02	.20+01	.91+00	.12+00	.13+00	.92-01	.00	.00	.13+00	.59-01	.54-01	610.
	01:30:00	900	.13+02	.12+01	.47+00	.10-01	.64-01	.00	.00	.00	.68-01	.17-01	.12-01	130.
	01:45:00	900	.13+02	.97+00	.39+00	.10-01	.32-01	.39-01	.00	.00	.57-01	.24-01	.20-01	277.
	02:00:00	900	.12+02	.13+01	.34+00	.20-01	.32-01	.00	.00	.00	.58-01	.14-01	.10-01	120.
	02:15:00	900	.11+02	.86+00	.24+00	.40-01	.00	.00	.00	.00	.42-01	.13-01	.94-02	113.
	02:30:00	900	.11+02	.80+00	.18+00	.71-01	.00	.00	.00	.00	.51-01	.15-01	.10-01	124.
	02:45:00	900	.31+01	.43+00	.19+00	.10-01	.32-01	.13-01	.00	.00	.21-01	.97-02	.63-02	96.
	03:00:00	900	.41+01	.36+00	.16+00	.40-01	.32-01	.00	.00	.00	.23-01	.89-02	.69-02	66.
	03:15:00	900	.50+01	.44+00	.24+00	.10-01	.32-01	.00	.00	.00	.26-01	.85-02	.59-02	57.
	03:30:00	900	.70+01	.57+00	.16+00	.30-01	.00	.00	.00	.00	.33-01	.90-02	.57-02	75.
	03:45:00	900	.85+01	.93+00	.34+00	.61-01	.64-01	.26-01	.00	.00	.52-01	.23-01	.20-01	229.
	04:00:00	900	.86+01	.12+01	.43+00	.91-01	.64-01	.26-01	.00	.00	.57-01	.28-01	.23-01	253.
	04:15:00	900	.92+01	.12+01	.47+00	.81-01	.13+00	.00	.00	.00	.56-01	.24-01	.19-01	157.
	04:30:00	900	.92+01	.13+01	.41+00	.71-01	.32-01	.13-01	.00	.00	.54-01	.22-01	.17-01	187.
	04:45:00	900	.75+01	.11+01	.47+00	.71-01	.64-01	.00	.00	.00	.46-01	.20-01	.14-01	129.
	05:00:00	900	.89+01	.14+01	.59+00	.40-01	.13+00	.00	.00	.00	.55-01	.28-01	.17-01	138.
	05:15:00	900	.91+01	.13+01	.65+00	.40-01	.64-01	.26-01	.00	.00	.58-01	.27-01	.21-01	234.
	05:30:00	900	.83+01	.15+01	.47+00	.91-01	.96-01	.26-01	.00	.00	.59-01	.30-01	.25-01	262.
	05:45:00	900	.92+01	.13+01	.39+00	.40-01	.32-01	.26-01	.00	.00	.55-01	.23-01	.19-01	225.
	06:00:00	900	.94+01	.16+01	.59+00	.81-01	.96-01	.52-01	.00	.00	.69-01	.38-01	.32-01	374.
	06:15:00	900	.89+01	.14+01	.43+00	.61-01	.13+00	.52-01	.00	.00	.65-01	.34-01	.32-01	359.
	06:30:00	900	.10+02	.16+01	.41+00	.11+00	.64-01	.00	.00	.00	.60-01	.25-01	.18-01	172.
	06:45:00	900	.10+02	.12+01	.47+00	.81-01	.00	.00	.00	.00	.54-01	.20-01	.12-01	139.
	07:00:00	900	.89+01	.16+01	.59+00	.40-01	.64-01	.26-01	.00	.00	.59-01	.27-01	.21-01	235.
	07:15:00	900	.91+01	.14+01	.45+00	.91-01	.64-01	.13-01	.00	.00	.57-01	.25-01	.19-01	209.
	07:30:00	900	.94+01	.14+01	.41+00	.61-01	.32-01	.13-01	.00	.00	.55-01	.22-01	.16-01	183.
	07:45:00	900	.93+01	.12+01	.63+00	.81-01	.96-01	.00	.00	.00	.56-01	.23-01	.18-01	155.
	08:00:00	900	.93+01	.14+01	.43+00	.51-01	.32-01	.26-01	.00	.00	.57-01	.25-01	.19-01	231.
	08:15:00	900	.74+01	.79+00	.39+00	.00	.13+00	.00	.00	.00	.41-01	.14-01	.12-01	92.
	08:30:00	900	.11+01	.43+00	.26+00	.40-01	.00	.13-01	.00	.00	.14-01	.11-01	.85-02	95.
	08:45:00	900	.85+00	.27+00	.22+00	.61-01	.00	.39-01	.00	.00	.18-01	.18-01	.16-01	209.
	09:00:00	900	.11+01	.46+00	.14+00	.30-01	.00	.13-01	.00	.00	.12-01	.93-02	.78-02	87.
	09:15:00	900	.10+01	.24+00	.19+00	.40-01	.32-01	.00	.00	.00	.10-01	.72-02	.59-02	42.
	09:30:00	900	.12+01	.39+00	.16+00	.20-01	.00	.00	.00	.00	.92-02	.52-02	.38-02	28.
	09:45:00	900	.11+01	.44+00	.23+00	.40-01	.00	.00	.00	.00	.11-01	.74-02	.47-02	41.
	10:00:00	900	.11+01	.49+00	.12+00	.40-01	.32-01	.00	.00	.00	.11-01	.77-02	.63-02	45.

TABLE 18 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UGM/M**3)
24 MAR 77														
	10:15:00	900	.12+01	.44+00	.14+00	.30-01	.96-01	.00	.00	.00	.14-01	.91-02	[illegible]	52.
	10:30:00	900	.13+01	.47+00	.10+00	.40-01	.00	.26-01	.00	.00	.16-01	.13-01	.11-01	147.
	10:45:00	900	.11+01	.31+00	.81-01	.30-01	.00	.13-01	.00	.00	.11-01	.79-02	.67-02	84.
	11:00:00	900	.10+01	.47+00	.12+00	.10-01	.00	.26-01	.00	.00	.14-01	.10-01	.92-02	128.
	11:15:00	900	.11+01	.20+00	.16+00	.10-01	.64-01	.13-01	.00	.00	.13-01	.89-02	.90-02	85.
	11:30:00	900	.94+00	.44+00	.14+00	.20-01	.00	.26-01	.00	.00	.14-01	.11-01	.10-01	134.
	11:45:00	900	.12+01	.39+00	.81-01	.10-01	.00	.00	.00	.00	.79-02	.55-02	.20-02	23.
	12:00:00	900	.10+01	.44+00	.10+00	.30-01	.64-01	.13-01	.00	.00	.14-01	.11-01	.10-01	98.
	12:15:00	900	.11+01	.40+00	.12+00	.10-01	.00	.00	.00	.00	.81-02	.40-02	.22-02	21.
	12:30:00	900	.11+01	.19+00	.18+00	.40-01	.32-01	.13-01	.00	.00	.13-01	.10-01	.94-02	96.
	12:45:00	900	.11+01	.21+00	.14+00	.20-01	.32-01	.00	.00	.00	.91-02	.54-02	.44-02	31.
	13:00:00	900	.76+00	.33+00	.20-01	.10-01	.00	.00	.00	.00	.55-02	.29-02	.15-02	15.
	13:15:01	901	.80+00	.30+00	.81-01	.20-01	.00	.13-01	.00	.00	.97-02	.71-02	.60-02	75.
	13:30:00	899	.12+01	.30+00	.26-01	.30-01	.00	.39-01	.00	.00	.17-01	.13-01	.13-01	190.
	13:45:00	900	.13+01	.40+00	.14+00	.40-01	.00	.00	.00	.00	.13-01	.73-02	.45-02	39.
	14:00:00	900	.85+00	.34+00	.41-01	.10-01	.32-01	.13-01	.00	.00	.10-01	.69-02	.68-02	76.
	14:15:00	900	.11+01	.31+00	.13+00	.51-01	.00	.00	.00	.00	.96-02	.65-02	.47-02	42.
	14:30:00	900	.10+01	.16+00	.12+00	.10-01	.64-01	.13-01	.00	.00	.12-01	.83-02	.87-02	83.
	14:45:00	900	.62+00	.11+00	.23-01	.00	.00	.00	.00	.00	.31-02	.89-03	.44-03	5.
	15:00:00	900	.77+00	.21+00	.61-01	.20-01	.00	.13-01	.00	.00	.86-02	.64-02	.57-02	74.
	15:15:00	900	.13+01	.26+00	.13+00	.10-01	.00	.26-01	.00	.00	.12-01	.94-02	.98-02	125.
	15:30:00	900	.12+01	.37+00	.14+00	.30-01	.00	.00	.00	.00	.94-02	.57-02	.36-02	33.
	15:45:00	900	.77+00	.30+00	.81-01	.10-01	.00	.00	.00	.00	.59-02	.31-02	.17-02	17.
	16:00:00	900	.98+00	.26+00	.16+00	.40-01	.32-01	.13-01	.00	.00	.13-01	.10-01	.94-02	96.
	16:15:00	900	.49+00	.16+00	.13+00	.10-01	.00	.00	.00	.00	.42-02	.27-02	.15-02	15.
	16:30:00	900	.80+00	.21+00	.14+00	.20-01	.32-01	.00	.00	.00	.78-02	.53-02	.43-02	79.
	15:45:00	900	.73+00	.27+00	.13+00	.20-01	.00	.00	.00	.00	.52-02	.39-02	.25-02	22.
	17:00:00	900	.81+00	.24+00	.16+00	.10-01	.64-01	.13-01	.00	.00	.12-01	.90-02	.89-02	84.
	17:15:00	900	.98+00	.24+00	.61-01	.20-01	.32-01	.00	.00	.00	.83-02	.45-02	.40-02	29.
	17:30:00	900	.71+00	.23+00	.41-01	.10-01	.00	.00	.00	.00	.50-02	.23-02	.14-02	14.
	17:45:00	900	.76+00	.16+00	.61-01	.20-01	.00	.26-01	.00	.00	.11-01	.93-02	.91-02	127.
	18:00:00	900	.78+00	.29+00	.10+00	.20-01	.64-01	.00	.00	.00	.90-02	.61-02	.59-02	55.
	18:15:00	900	.75+00	.20+00	.13+00	.20-01	.32-01	.00	.00	.00	.79-02	.57-02	.45-02	29.
	18:30:00	900	.74+00	.33+00	.12+00	.30-01	.00	.00	.00	.00	.74-02	.52-02	.34-02	29.
	18:45:00	900	.67+00	.24+00	.81-01	.71-01	.00	.00	.00	.00	.86-02	.75-02	.58-02	49.
	19:00:00	900	.15+01	.84+00	.57+00	.91-01	.64-01	.39-01	.00	.00	.31-01	.28-01	.24-01	258.
	19:15:00	900	.75+00	.31+00	.12+00	.10-01	.64-01	.13-01	.00	.00	.12-01	.88-02	.98-02	93.
	19:30:00	900	.56+00	.27+00	.12+00	.00	.32-01	.00	.00	.00	.59-02	.36-02	.28-02	16.
	19:45:00	900	.67+00	.16+00	.13+00	.00	.00	.00	.00	.00	.43-02	.23-02	.11-03	9.
	20:00:00	900	.45+00	.26+00	.12+00	.30-01	.00	.13-01	.00	.00	.87-02	.79-02	.67-02	80.
	20:15:00	900	.57+00	.27+00	.13+00	.10-01	.00	.26-01	.00	.00	.11-01	.93-02	.97-02	123.

TABLE 18 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADINGS
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
24 MAR 77														
	20:30:00	900	.42+00	.27+00	.61-01	.13-01	.00	.00	.00	.00	.43-02	.25-02	.15-02	13.
	20:45:00	900	.42+00	.20+00	.81-01	.20-01	.00	.00	.00	.00	.46-02	.34-02	.22-02	19.
	21:00:00	900	.53+00	.30+00	.11+00	.00	.32-01	.00	.00	.00	.57-02	.35-02	.28-02	16.
	21:15:00	900	.45+00	.24+00	.12+00	.00	.32-01	.00	.00	.00	.54-02	.35-02	.28-02	15.
	21:30:00	900	.62+00	.23+00	.16+00	.23-01	.00	.00	.00	.00	.62-02	.44-02	.27-02	22.
	21:45:00	900	.81+00	.27+00	.28+00	.51-01	.32-01	.00	.00	.00	.10-01	.83-02	.67-02	47.
	22:00:00	900	.85+00	.50+00	.33+00	.43-01	.00	.00	.00	.00	.11-01	.85-02	.52-02	42.
	22:15:00	900	.85+00	.53+00	.18+00	.00	.32-01	.00	.00	.00	.91-02	.53-02	.36-02	23.
	22:30:00	900	.84+00	.33+00	.26+00	.33-01	.00	.15-01	.00	.00	.12-01	.99-02	.76-02	86.
	22:45:00	900	.76+00	.39+00	.24+00	.81-01	.32-01	.00	.00	.00	.13-01	.12-01	.92-02	67.
	23:00:00	900	.87+00	.41+00	.22+00	.33-01	.00	.00	.00	.00	.92-02	.57-02	.40-02	33.
	23:15:00	900	.66+00	.31+00	.22+00	.30-01	.00	.13-01	.00	.00	.11-01	.93-02	.73-02	88.
	23:30:00	900	.81+00	.35+00	.16+00	.40-01	.00	.00	.00	.00	.95-02	.72-02	.46-02	39.
	23:45:00	900	.11+01	.56+00	.24+00	.40-01	.00	.13-01	.00	.00	.14-01	.11-01	.86-02	96.

Weather Summary

Date: 25 March 1977

Synoptic

Surface: Deep surface low-pressure area over eastern North Dakota with cold front extending southwest to low over Colorado and thence southward to southwestern New Mexico.

500 Millibar: Upper air cutoff low developed over west central California with southwesterly flow over New Mexico.

Holloman AFB

Clouds: Increasing cloudiness with scattered middle (altostratus) and high (cirrus) clouds during the morning and scattered low (cumulus) and middle clouds and overcast high clouds during the afternoon with cloud bases at 2000 m, 5500 m, and 7600 m AGL, respectively.

Wind: Generally southerly at 5-8 m sec^{-1} with gust to 13 m sec^{-1} during midafternoon.

Visibility: Generally greater than 60 km.

Maximum temperature:	23.3°C	Corresponding vapor pressure:	2.2 Torr
Minimum temperature:	9.4°C	Corresponding vapor pressure:	1.7 Torr

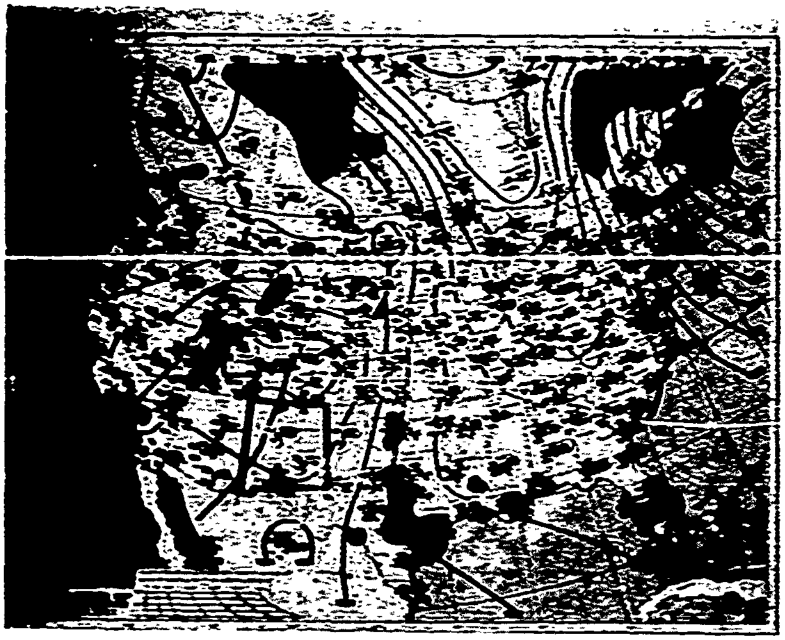


Figure 15a. Surface weather map for 25 March 1977.

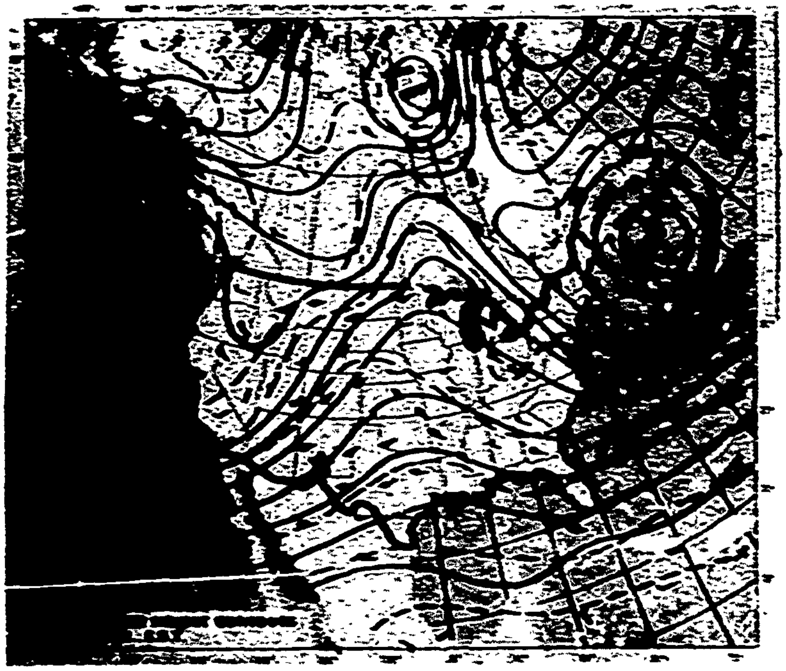


Figure 15b. 500-millibar height contours for 25 March 1977.

TABLE 19. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 24 March 1977 Remarks
0100	12.9	3.4	-3.2	0	0	10 Ci	
0200	13.2	3.5	-3.0	0	0	10 Ci	
0300	13.2	3.7	-2.2	0	0	10 Ci	0300 Mag tape quit, 0317 mag tape restarted
0400	11.9	3.0	-5.2	0	0	10 Ci	
0500	12.2	3.3	-4.0	0	0	30 Ci	Propeller driven plane over Mar Site continued N
0600	11.3	3.2	-4.2	0	0	50 Ci	
0700	14.8	3.5	-3.1	0	0	70 Ci	
0800	13.4	4.1	-1.0	0	40 Ac	80 Ci	
0900	18.0	4.6	0.7	0	0	80 Cs	0945 - checked balance on ΔT: reconditioned lines; ok 1020
1000	19.5	5.0	1.7	0	0	90 Cs	
1100	21.4	4.2	-0.3	0	0	90 Cs	
1200	21.5	4.4	0.2	0	0	90 Cs	
1300	21.9	3.8	-1.6	0	0	90 Cs	
1400	20.8	4.3	-0.1	0	0	90 Cs	
1500	20.4	3.2	-3.8	0	0	95 Cs	Acoustic sounder off at 1545, back on line at 1700
1600	20.2	2.9	-4.8	0	0	100 Cs	
1700	19.4	3.3	-3.6	0	0	100 Cs	
1800	17.7	3.0	-5.0	0	20 Ac	80 Cs	
1900	15.3	2.6	-6.6	0	20 Ac	80 Cs	
2000	16.2	3.1	-4.3	0	20 Ac	80 Cs	
2100	14.5	4.2	-0.8	0	100 As	-	
2200	15.3	4.6	0.6	0	100 As	-	32 meter "ΔT" out
2300	15.0	5.4	2.7	0	100 As	-	"V" at 32 meters seems to be sluggish
2400	14.1	5.1	2.0	0	100 As	-	

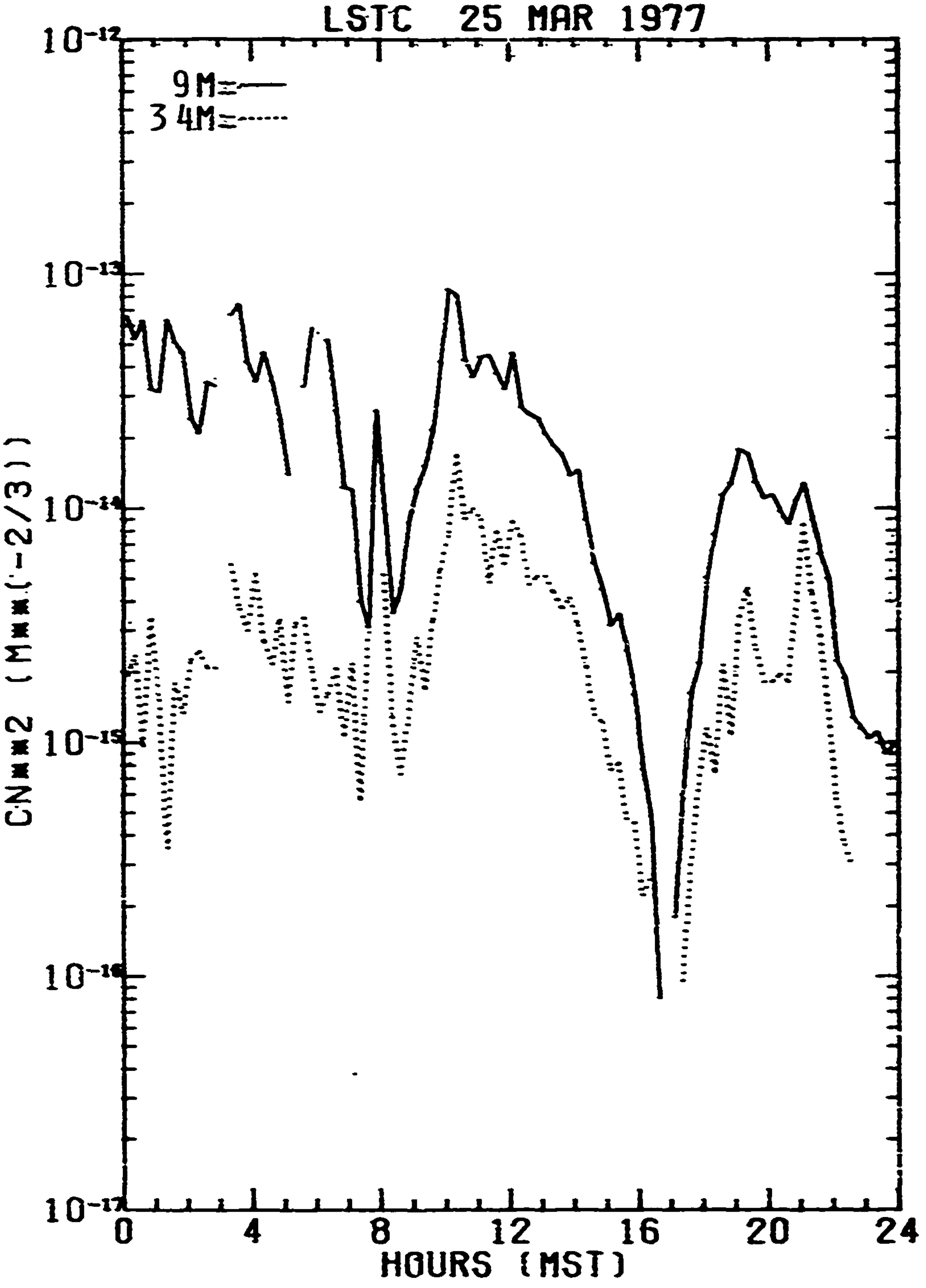


Figure 16. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 25 March 1977.

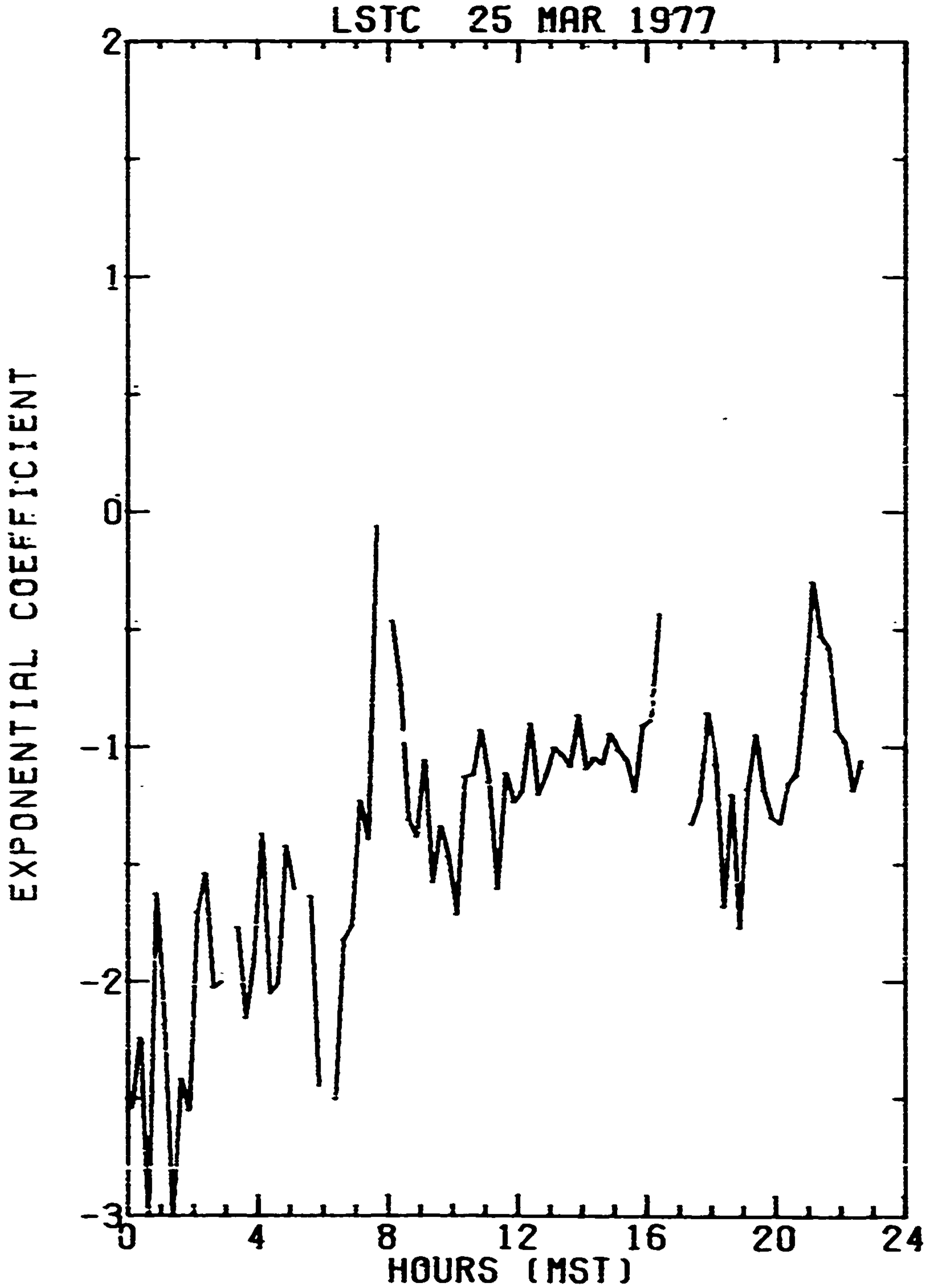


Figure 17. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 25 March 1977.

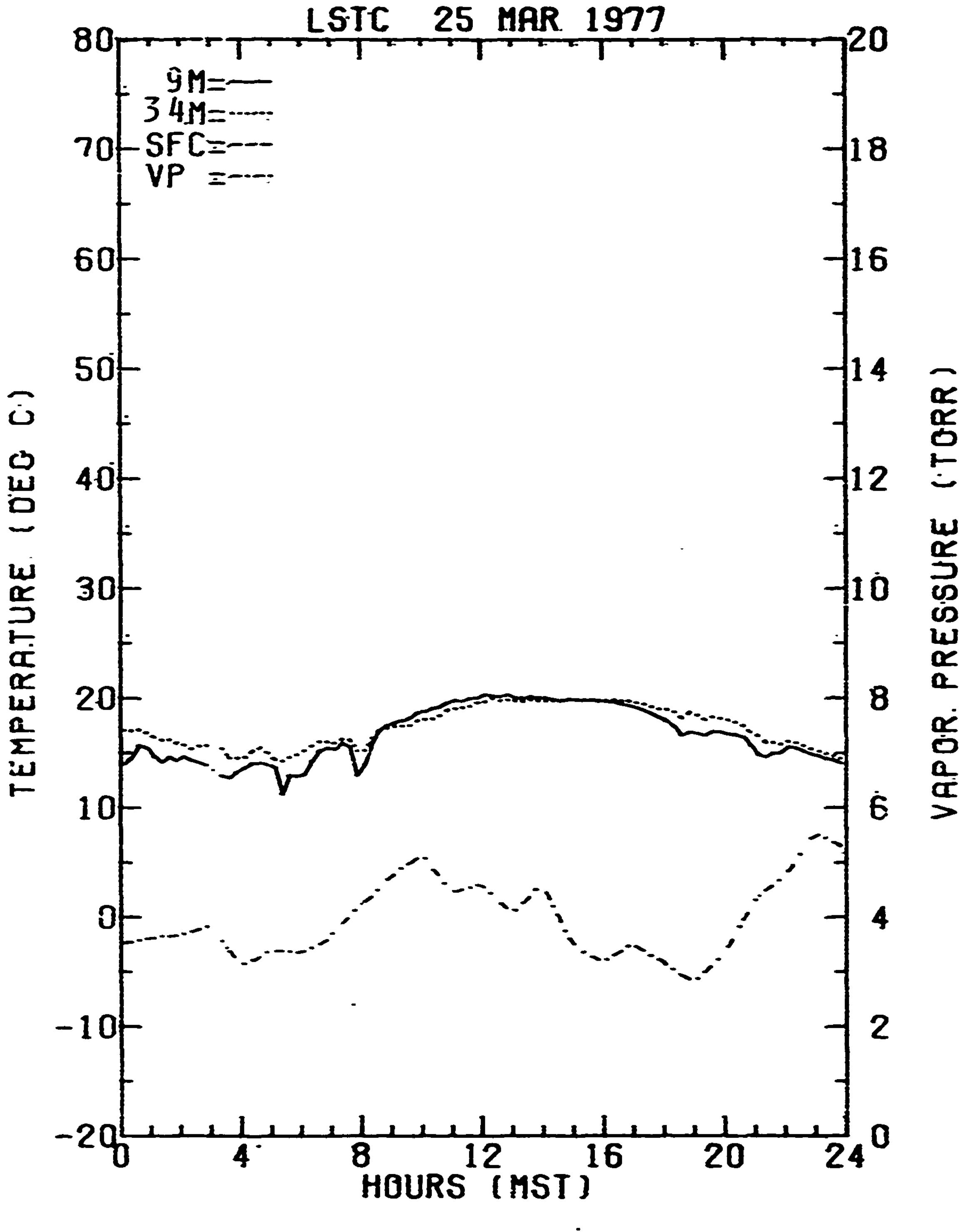


Figure 18. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 25 March 1977.

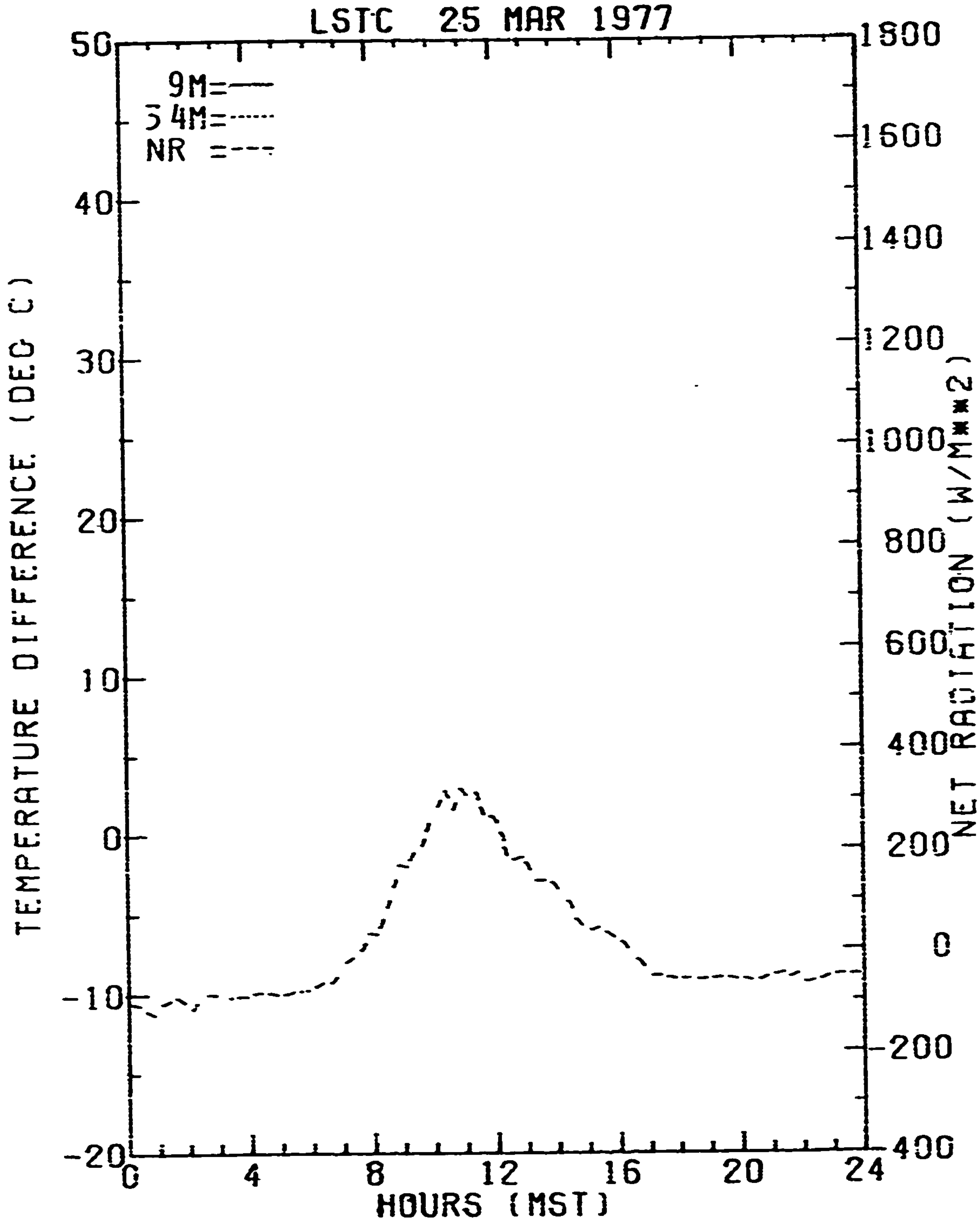


Figure 19. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 25 March 1977.

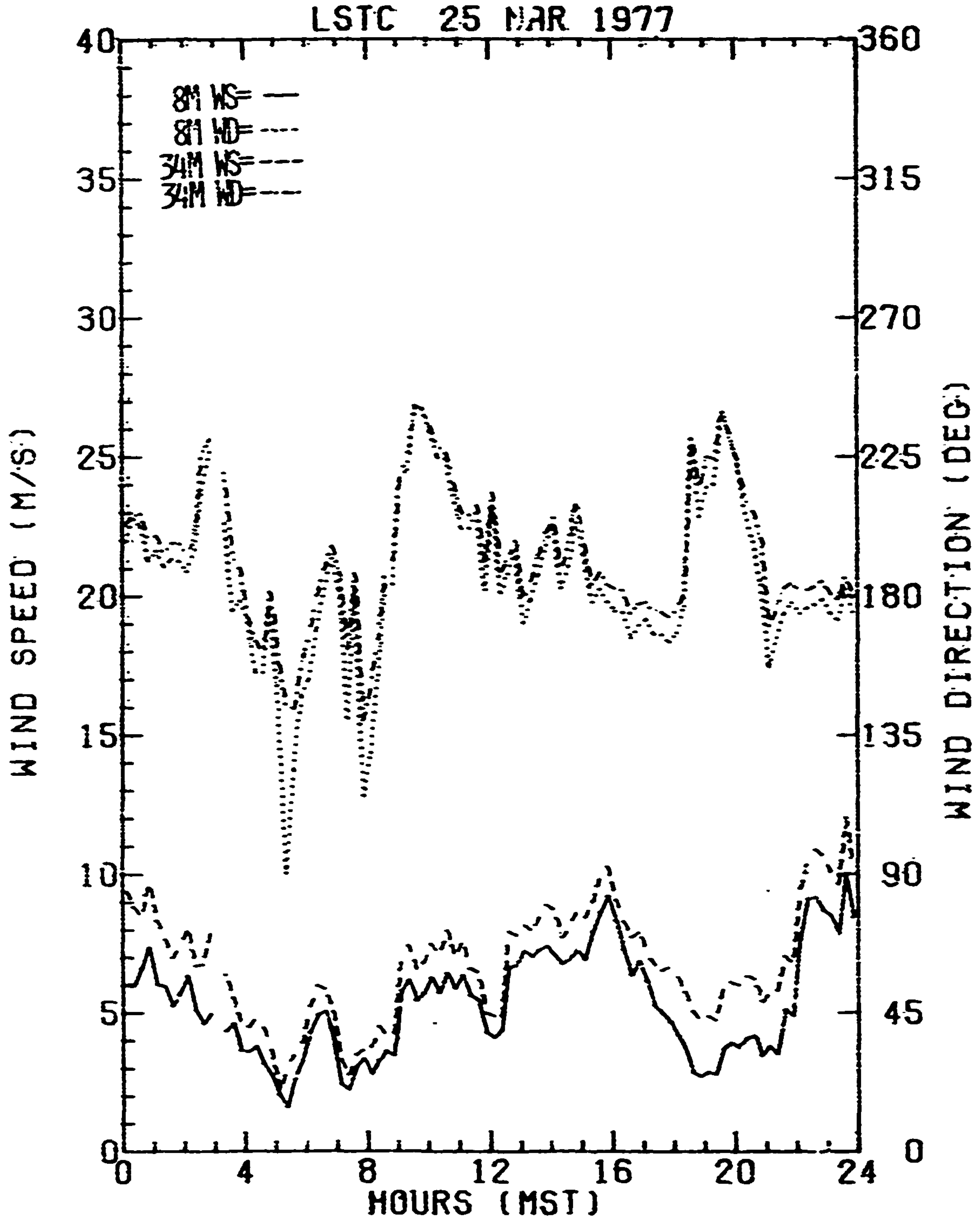


Figure 20. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 25 March 1977.

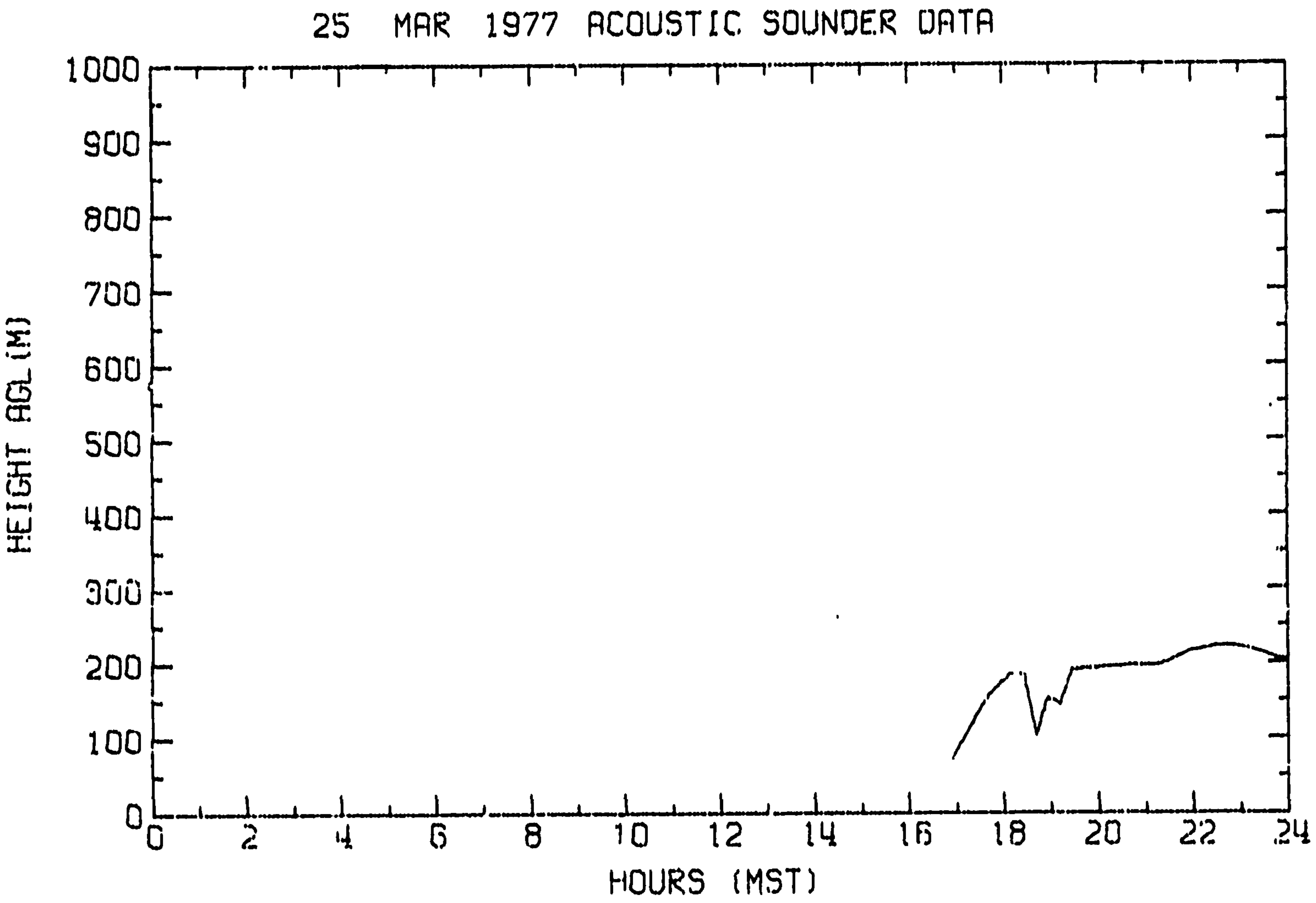


Figure 21. Inversion heights, LSTC, 25 March 1977.

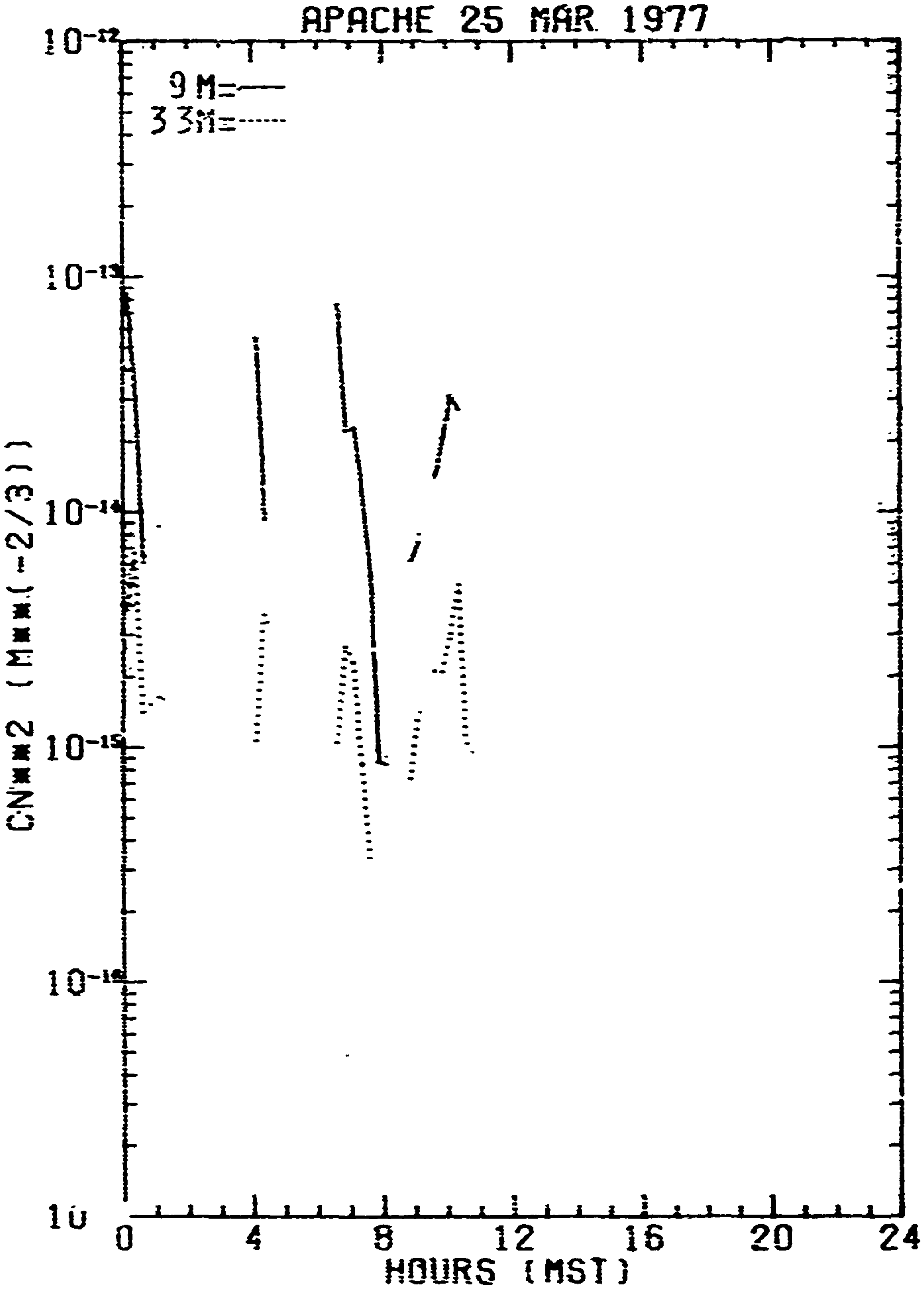


Figure 22. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 25 March 1977.

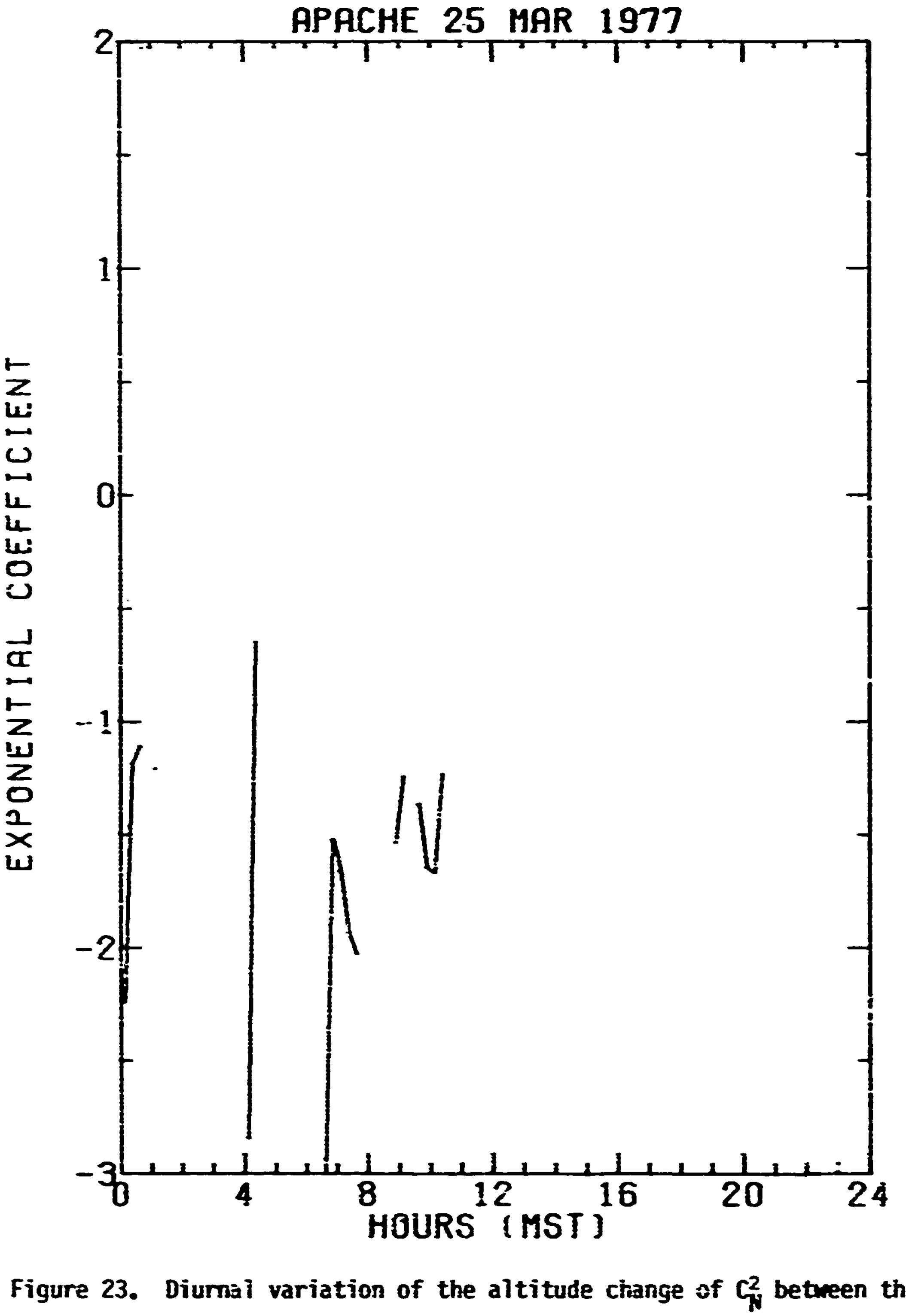


Figure 23. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 25 March 1977.

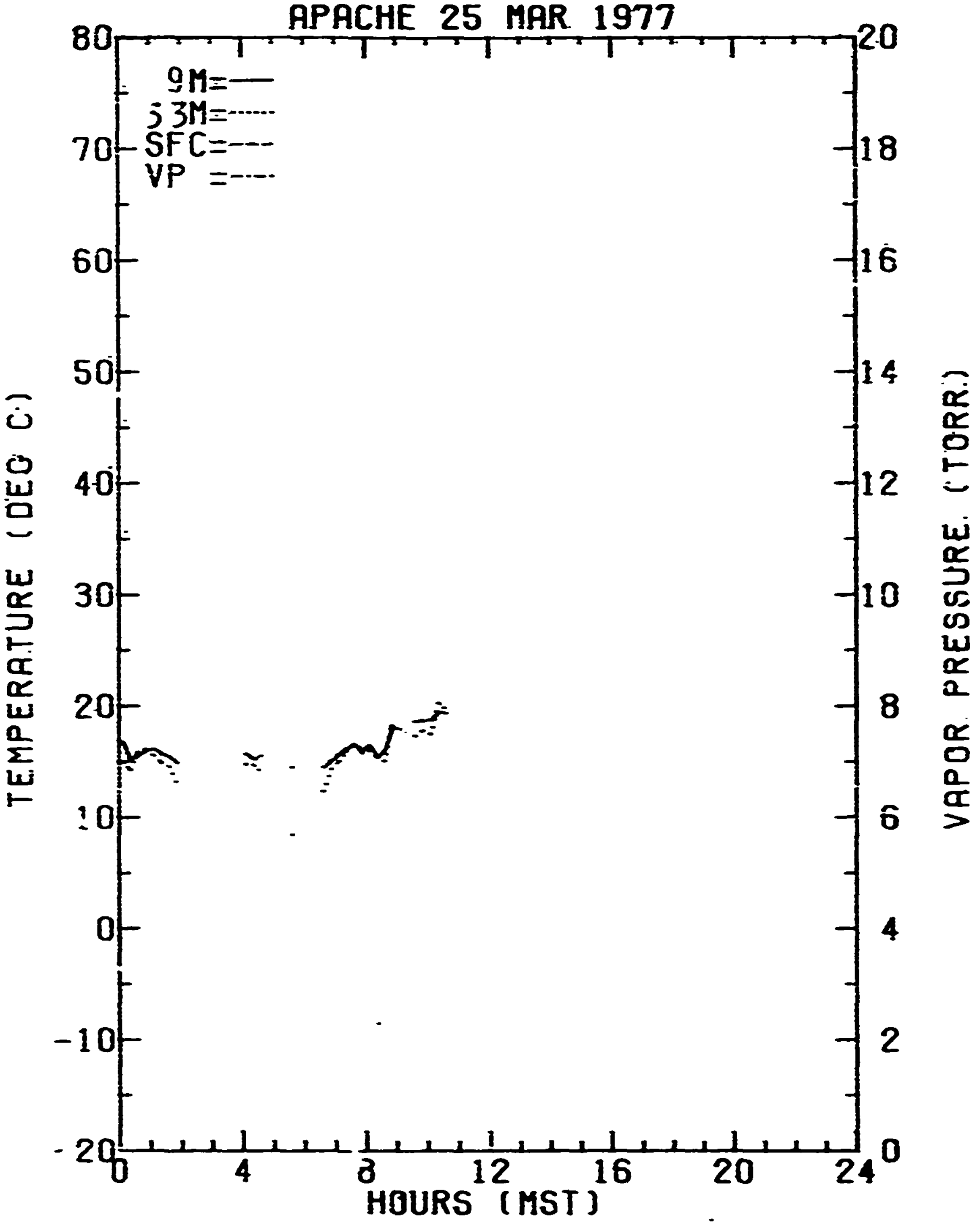


Figure 24. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 25 March 1977.

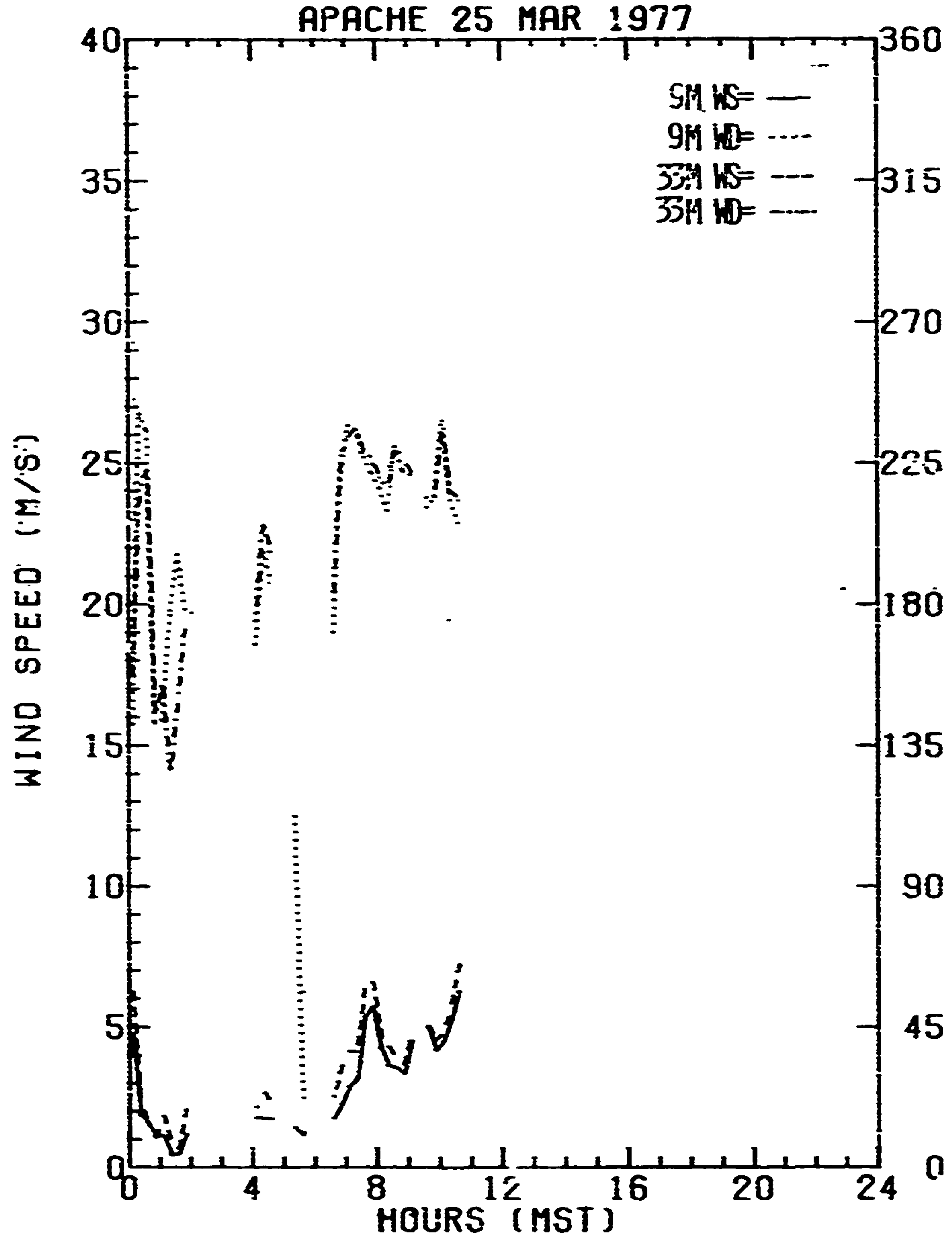


Figure 25. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 25 March 1977.

TABLE 20
APACHE SITE RAWINSONDE DATA

DATE: 25 MAR 77 RELEASE NO. 5 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.5	11.7	2.0	0.0	0.0
45.5	651.0	16.1	2.5	0.0	0.0
223.0	637.5	14.5	2.2	0.0	0.0
944.2	584.5	5.9	1.6	0.0	0.0
1077.9	575.1	6.6	1.4	0.0	0.0
1820.3	525.0	2.1	1.0	233.9	15.8
3350.9	432.1	-9.7	0.4	226.2	15.0

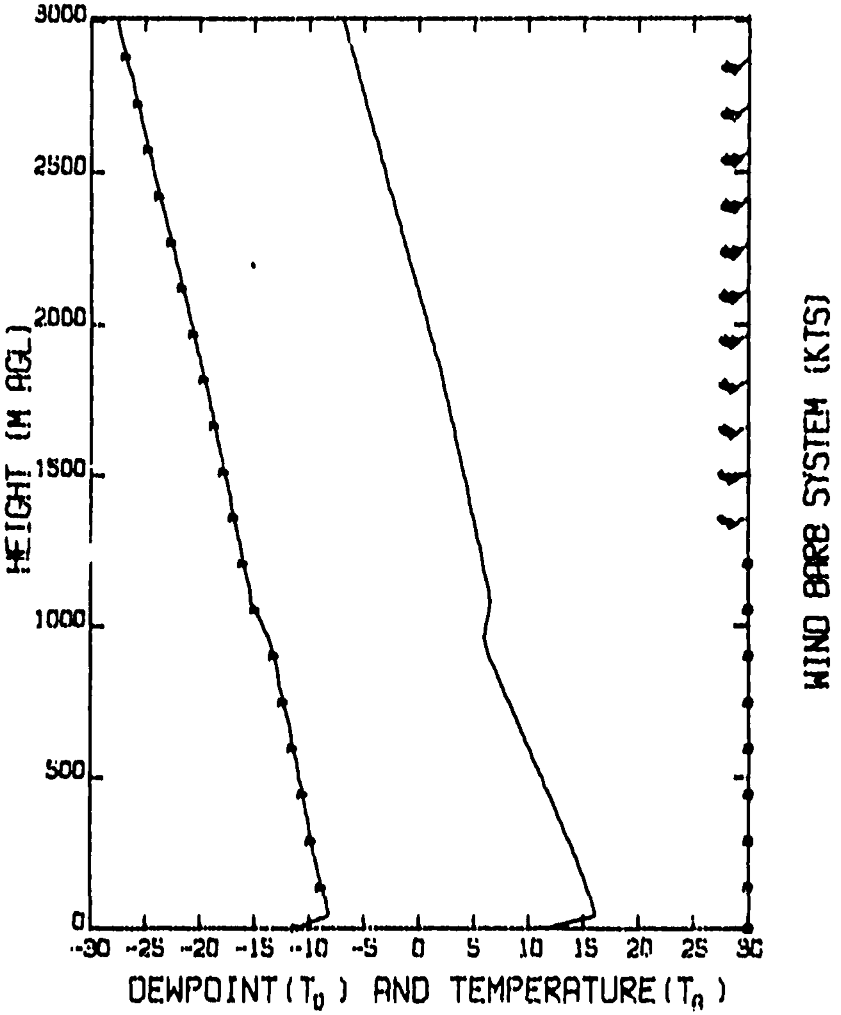


TABLE 21
APACHE SITE RAWINSONDE DATA

DATE: 25 MAR 77 RELEASE NO.: 6 RELEASE TIME: 1000 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.7	19.5	1.7	210.0	5.1
78.6	649.7	16.5	3.2	211.9	5.2
239.9	637.5	15.5	2.9	215.6	5.3
1566.3	543.2	2.8	1.5	239.0	9.7
1841.9	525.0	0.9	1.2	234.3	13.5
2688.9	472.0	-5.2	0.7	232.5	18.6
3418.0	430.0	-8.2	0.6	228.9	18.0

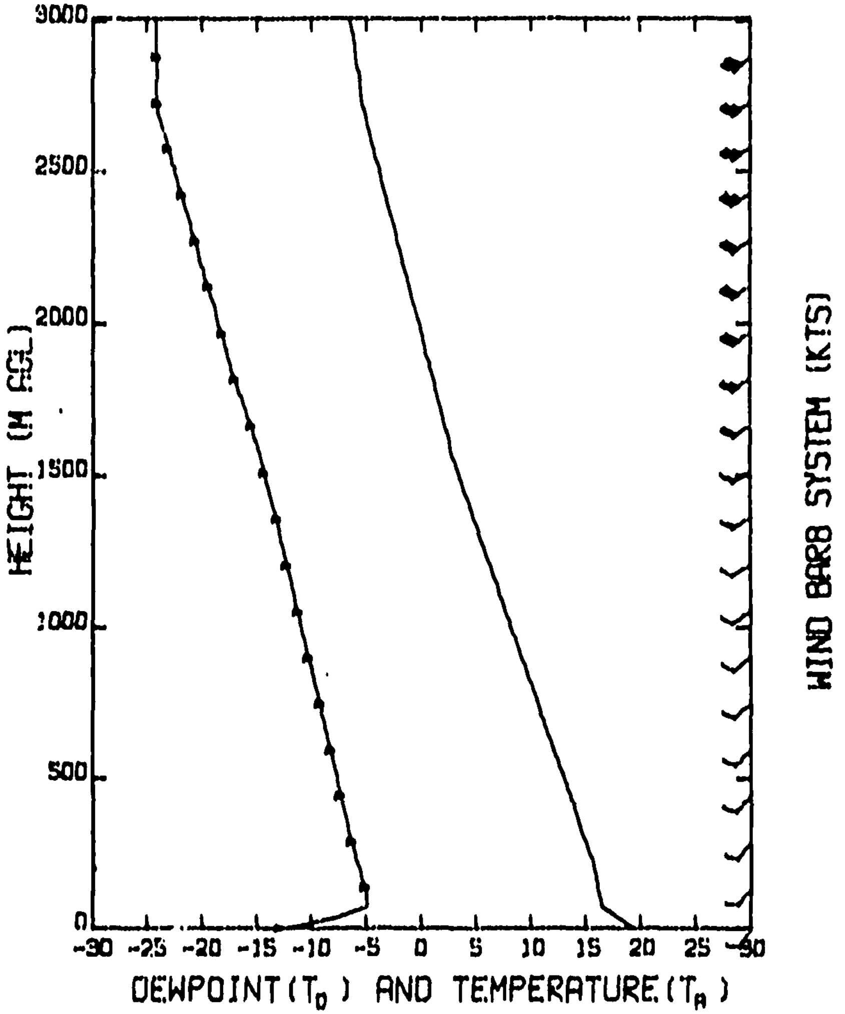


TABLE 22
APACHE SITE RAWINSONDE DATA

DATE: 25 MAR 77 RELEASE NO.: 7 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.8	17.0	2.8	210.0	2.6
144.6	642.9	19.6	3.3	0.0	0.0
217.1	637.5	19.4	3.2	0.0	0.0
932.2	585.9	11.2	2.6	0.0	0.0
1063.3	576.7	9.5	2.4	200.0	9.6
1833.1	525.0	1.8	1.8	217.5	10.9
3005.9	452.7	-9.1	1.3	201.5	13.9

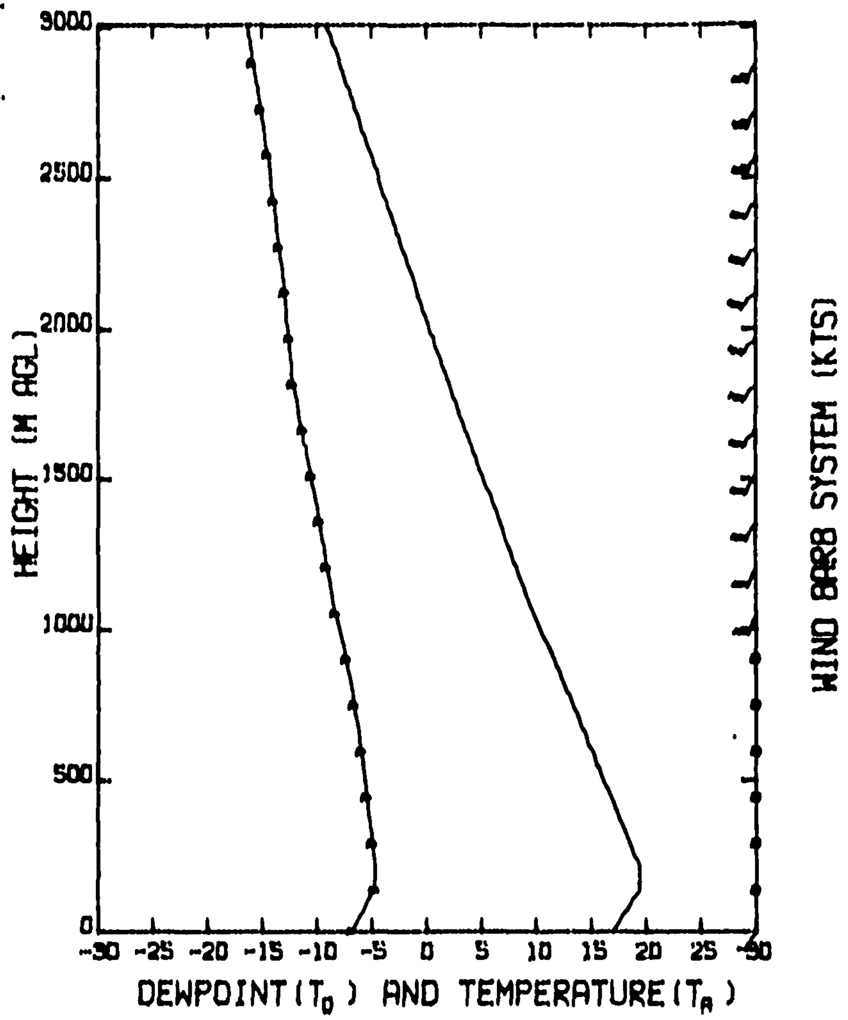
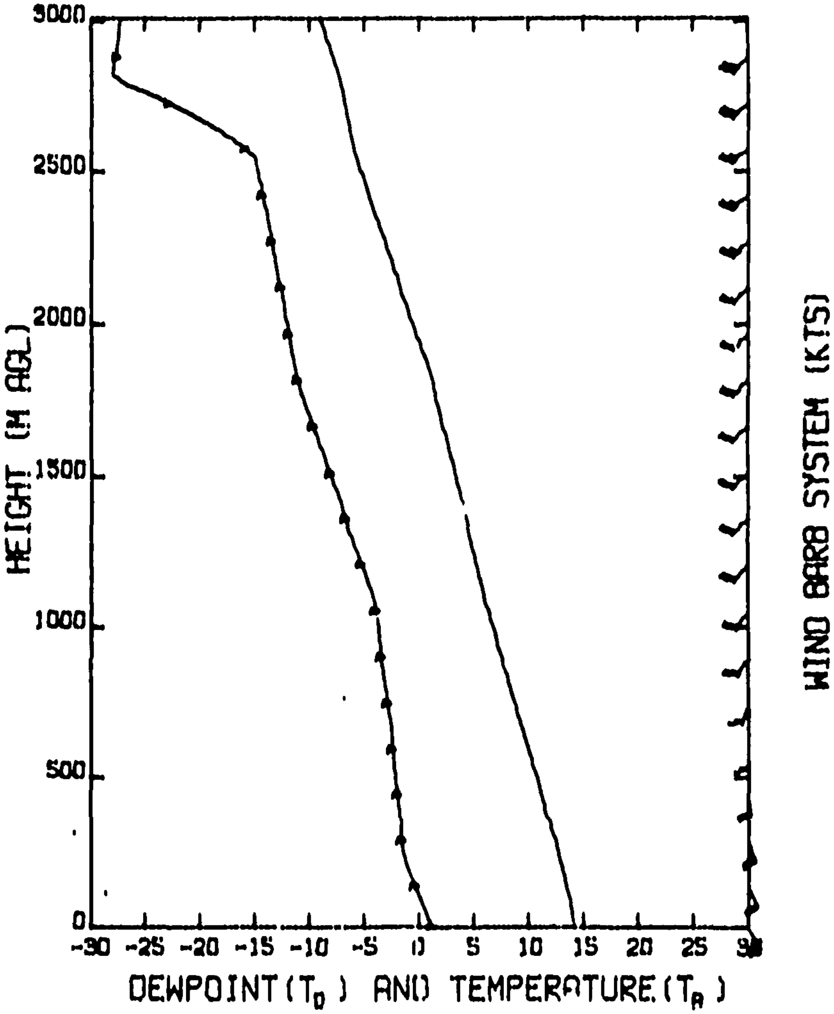


TABLE 23
APACHE SITE RAWINSONDE DATA

DATE: 25 MAR 77 RELEASE NO.: 8 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.4	14.2	5.0	150.0	11.3
221.2	637.5	12.9	4.1	160.4	10.1
1085.4	574.5	6.0	3.4	216.7	9.8
1817.9	525.0	1.1	1.9	223.4	11.4
2555.4	478.5	-5.9	1.4	226.4	13.6
2804.7	463.5	-7.3	0.5	222.5	14.6
3494.1	423.9	-13.1	0.5	209.5	14.3



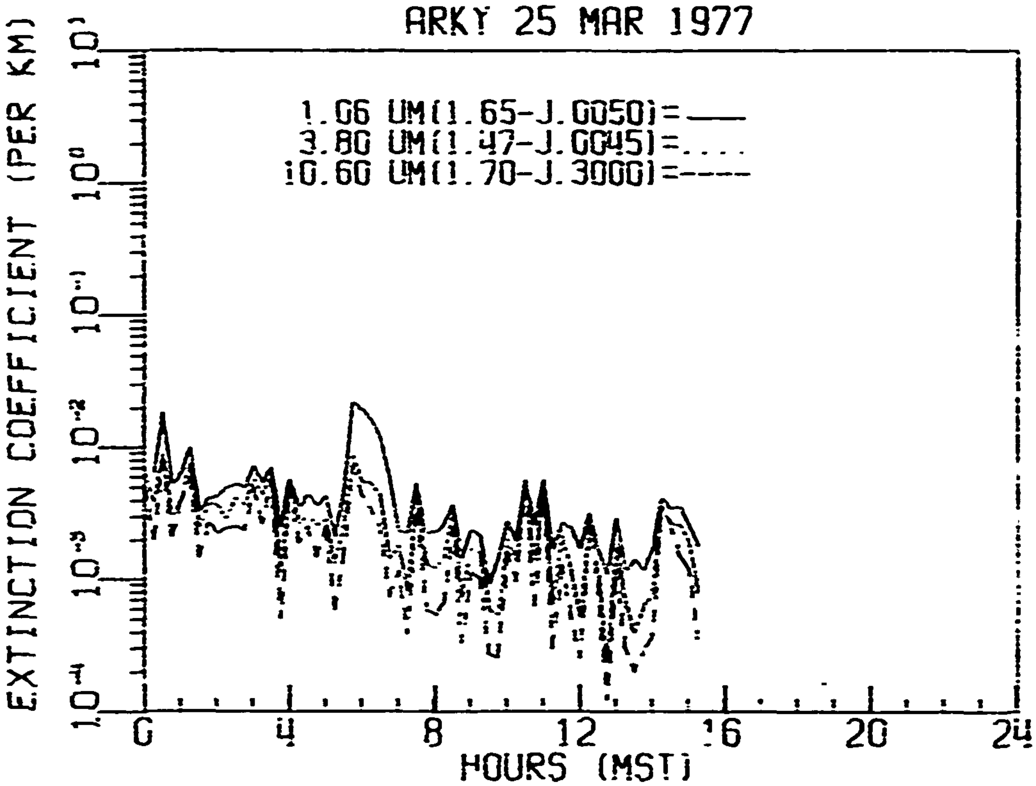


Figure 26. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 25 March 1977.

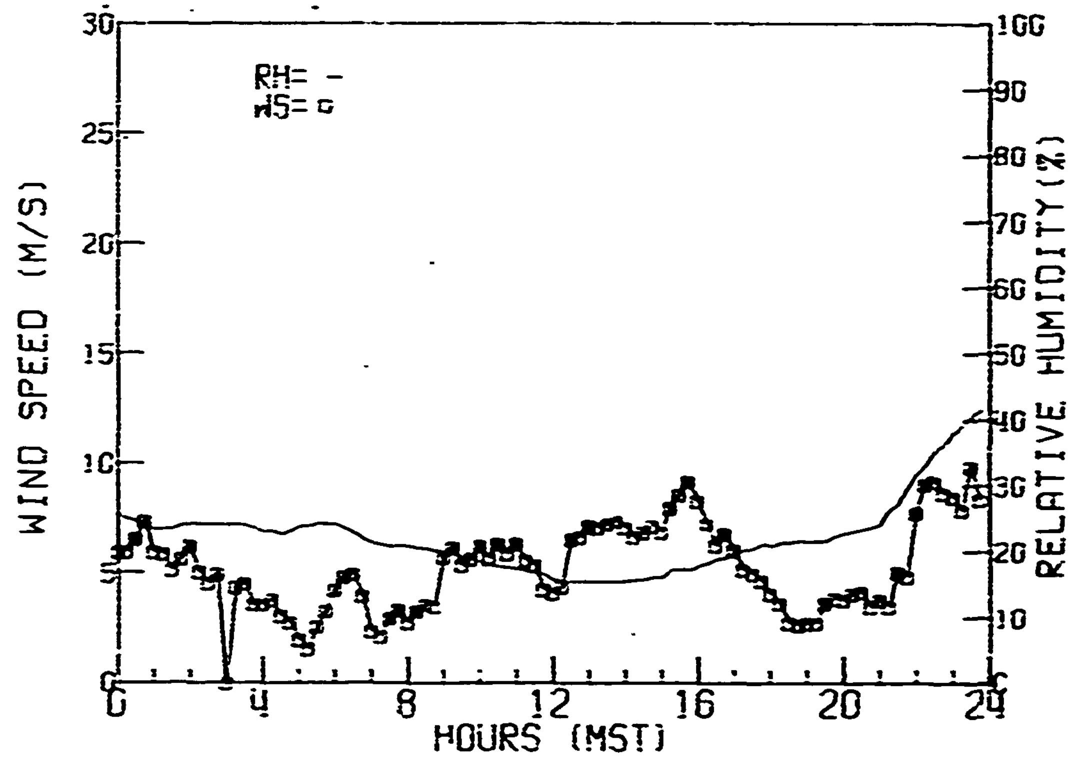


Figure 27. Diurnal variation of windspeed and relative humidity, Arky Site, 25 March 1977.

TABLE 24

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
25 MAR 77														
	00:00:00	900	.71+00	.41+00	.16+00	.20-01	.32-01	.00	.00	.00	.88-02	.62-02	.47-02	31.
	00:15:00	900	.59+00	.33+00	.14+00	.13-01	.00	.00	.00	.00	.59-02	.38-02	.20-02	17.
	00:30:00	900	.30+01	.19+00	.61-01	.30-01	.32-01	.13-01	.00	.00	.19-01	.90-02	.87-02	100.
	00:45:00	900	.79+00	.14+00	.61-01	.20-01	.00	.00	.00	.00	.45-02	.31-02	.21-02	29.
	01:00:00	900	.67+00	.14+00	.20-01	.00	.00	.13-01	.00	.00	.66-02	.41-02	.40-02	60.
	01:15:00	900	.75+00	.47+00	.14+00	.40-01	.32-01	.00	.00	.00	.13-01	.77-02	.60-02	43.
	01:30:00	900	.32+00	.13+00	.16+00	.10-01	.00	.00	.00	.00	.34-02	.25-02	.15-02	12.
	01:45:00	900	.27+00	.13+00	.81-01	.30-01	.00	.00	.00	.00	.41-02	.38-02	.27-02	22.
	02:00:00	900	.29+00	.24+00	.10+00	.20-01	.00	.00	.00	.00	.45-02	.37-02	.23-02	19.
	02:15:00	900	.53+00	.20+00	.81-01	.00	.32-01	.00	.00	.00	.51-02	.29-02	.25-02	14.
	02:30:00	900	.56+00	.11+00	.18+00	.20-01	.00	.00	.00	.00	.54-02	.42-02	.26-02	21.
	02:45:00	900	.45+00	.23+00	.13+00	.20-01	.00	.00	.00	.00	.53-02	.37-02	.23-02	20.
	03:00:00	900	.45+00	.26+00	.81-01	.10-01	.00	.13-01	.00	.00	.73-02	.59-02	.51-02	67.
	03:15:00	900	.49+00	.17+00	.11+00	.20-01	.00	.00	.00	.00	.55-02	.44-02	.27-02	21.
	03:30:00	900	.35+00	.23+00	.81-01	.20-01	.00	.13-01	.00	.00	.73-02	.65-02	.57-02	72.
	03:45:00	900	.33+00	.16+00	.41-01	.00	.00	.00	.00	.00	.25-02	.11-02	.52-03	5.
	04:00:00	900	.20+00	.11+00	.12+00	.10-01	.00	.13-01	.00	.00	.58-02	.57-02	.50-02	65.
	04:15:00	900	.36+00	.14+00	.41-01	.20-01	.00	.00	.00	.00	.36-02	.27-02	.19-02	16.
	04:30:00	900	.24+00	.24+00	.16+00	.00	.32-01	.00	.00	.00	.44-02	.32-02	.26-02	33.
	04:45:00	900	.36+00	.20+00	.81-01	.10-01	.00	.00	.00	.00	.37-02	.21-02	.15-02	12.
	05:00:00	900	.35+00	.16+00	.10+00	.00	.32-01	.00	.00	.00	.43-02	.29-02	.25-02	13.
	05:15:00	900	.25+00	.86-01	.81-01	.00	.00	.00	.00	.00	.21-02	.13-02	.59-03	5.
	05:30:00	900	.62+00	.13+00	.12+00	.10-01	.00	.00	.00	.00	.47-02	.28-02	.16-02	14.
	05:45:00	900	.36+01	.51+00	.16+00	.20-01	.65-01	.00	.00	.00	.22-01	.88-02	.74-02	59.
	06:00:00	900	.38+01	.39+00	.81-01	.10-01	.32-01	.00	.00	.00	.19-01	.56-02	.44-02	44.
	06:15:00	900	.32+01	.31+00	.12+00	.20-01	.00	.00	.00	.00	.16-01	.53-02	.34-02	40.
	06:30:00	900	.23+01	.30+00	.14+00	.10-01	.00	.00	.00	.00	.12-01	.43-02	.25-02	28.
	06:45:00	900	.12+01	.20+00	.20-01	.00	.00	.00	.00	.00	.61-02	.14-02	.75-03	11.
	07:00:00	900	.20+00	.86-01	.61-01	.10-01	.00	.00	.00	.00	.23-02	.18-02	.12-02	10.
	07:15:00	900	.35+00	.13+00	.20-01	.00	.00	.00	.00	.00	.22-02	.82-03	.38-03	4.
	07:30:00	900	.34+00	.11+00	.81-01	.00	.00	.13-01	.00	.00	.55-02	.45-02	.42-02	59.
	07:45:00	900	.26+00	.10+00	.81-01	.00	.00	.00	.00	.00	.23-02	.14-02	.61-03	5.
	08:00:00	900	.30+00	.11+00	.61-01	.00	.00	.00	.00	.00	.23-02	.12-02	.55-03	5.
	08:15:00	900	.33+00	.13+00	.81-01	.00	.00	.00	.00	.00	.27-02	.13-02	.67-03	6.
	08:30:00	900	.25+00	.13+00	.41-01	.30-01	.00	.00	.00	.00	.37-02	.34-02	.25-02	21.
	08:45:00	900	.23+00	.57-01	.41-01	.00	.00	.00	.00	.00	.15-02	.74-03	.34-03	3.
	09:00:00	900	.20+00	.13+00	.41-01	.10-01	.00	.00	.00	.00	.24-02	.18-02	.13-02	10.
	09:15:00	900	.23+00	.72-01	.41-01	.10-01	.00	.00	.00	.00	.22-02	.16-02	.11-02	9.
	09:30:00	900	.11+00	.29-01	.41-01	.00	.00	.00	.00	.00	.94-03	.60-03	.27-03	2.
	09:45:00	900	.26+00	.57-01	.20-01	.00	.00	.00	.00	.00	.15-02	.33-03	.26-03	3.
	10:00:00	900	.23+00	.13+00	.00	.20-01	.00	.00	.00	.00	.28-02	.21-02	.16-02	15.

TABLE 24 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
		1	2	3	4	5	6	7	8	1.06	3.8	10.6	
25 MAR 77													
10:15:00	900	.20+00	.86-01	.26-01	.10-01	.00	.00	.00	.00	.20-02	.14-02	.97-03	9.
10:30:00	900	.29+00	.11+00	.41-01	.20-01	.61-01	.00	.00	.00	.57-02	.47-02	.52-02	29.
10:45:00	900	.34+00	.10+00	.81-01	.00	.00	.00	.00	.00	.26-02	.14-02	.64-03	5.
11:00:00	900	.22+00	.57-01	.61-01	.00	.32-01	.13-01	.00	.00	.57-02	.51-02	.56-02	63.
11:15:00	900	.26+00	.06-01	.20-01	.00	.00	.00	.00	.00	.17-02	.64-03	.30-03	3.
11:30:00	900	.20+00	.11+00	.51-01	.10-01	.00	.00	.00	.00	.16-02	.22-02	.13-02	10.
11:45:00	900	.36+00	.10+00	.61-01	.00	.00	.00	.00	.00	.25-02	.12-02	.54-03	5.
12:00:00	900	.34+00	.43-01	.20-01	.00	.00	.00	.00	.00	.17-02	.52-03	.26-03	3.
12:15:00	900	.17+00	.72-01	.41-01	.10-01	.32-01	.00	.00	.00	.32-02	.26-02	.27-02	15.
12:30:00	900	.20+00	.57-01	.00	.10-01	.00	.00	.00	.00	.17-02	.11-02	.53-03	9.
12:45:00	900	.22+00	.43-01	.00	.00	.00	.00	.00	.00	.11-02	.24-03	.13-03	2.
13:00:00	900	.37+00	.86-01	.61-01	.10-01	.00	.00	.00	.00	.30-02	.19-02	.12-02	11.
13:15:00	900	.16+00	.43-01	.41-01	.00	.00	.00	.00	.00	.12-02	.67-03	.30-03	3.
13:30:00	900	.30+00	.14-01	.20-01	.00	.00	.00	.00	.00	.14-02	.40-03	.21-03	3.
13:45:00	900	.18+00	.29-01	.41-01	.00	.00	.00	.00	.00	.12-02	.63-03	.29-03	2.
14:00:00	900	.25+00	.72-01	.41-01	.00	.00	.00	.00	.00	.17-02	.81-03	.37-03	4.
14:15:00	900	.26+00	.79-01	.20-01	.00	.00	.13-01	.00	.00	.41-02	.35-02	.37-02	56.
14:30:00	900	.17+00	.14+00	.20-01	.10-01	.32-01	.00	.00	.00	.35-02	.25-02	.27-02	15.
14:45:00	900	.33+00	.16+00	.10+00	.10-01	.00	.00	.00	.00	.36-02	.26-02	.15-02	12.
15:00:00	900	.21+00	.11+00	.61-01	.10-01	.00	.00	.00	.00	.25-02	.20-02	.12-02	10.
15:15:00	900	.22+00	.14+00	.20-01	.00	.00	.00	.00	.00	.18-02	.82-03	.37-03	4.

Weather Summary

Date: 26 March 1977

Synoptic

Surface: Weak surface low-pressure area over northern New Mexico, with cold front extending southwest into Mexico, passed WSMR about 1800 MST.

500 Millibar: Upper air closed low over northern Baja moving slowly east with instability showers ahead of the low. Strong southwesterly flow over New Mexico in advance of the closed low.

Holloman AFB

Clouds: Mostly overcast. Ceilings as low as 850 m AGL with layers above and occasional rain showers, blowing dust and blowing sand. A few thunderstorms were reported over the area during the late afternoon and early evening.

Wind: Southeasterly 10 m $\sec^{-1}$ becoming southwesterly 5 m $\sec^{-1}$ by 1800 MST. Peak gust 16 m $\sec^{-1}$ out of the southeast shortly before 0800 MST.

Visibility: Generally greater than 32 km, lowering to 8 km in rain showers and fog by 1900 MST, then improving to greater than 16 km for remainder of day.

Maximum temperature:	18.9°C	Corresponding vapor pressure:	6.3 Torr
Minimum temperature:	6.7°C	Corresponding vapor pressure:	6.1 Torr

Figure 28a. Surface weather map for 26 March 1977.

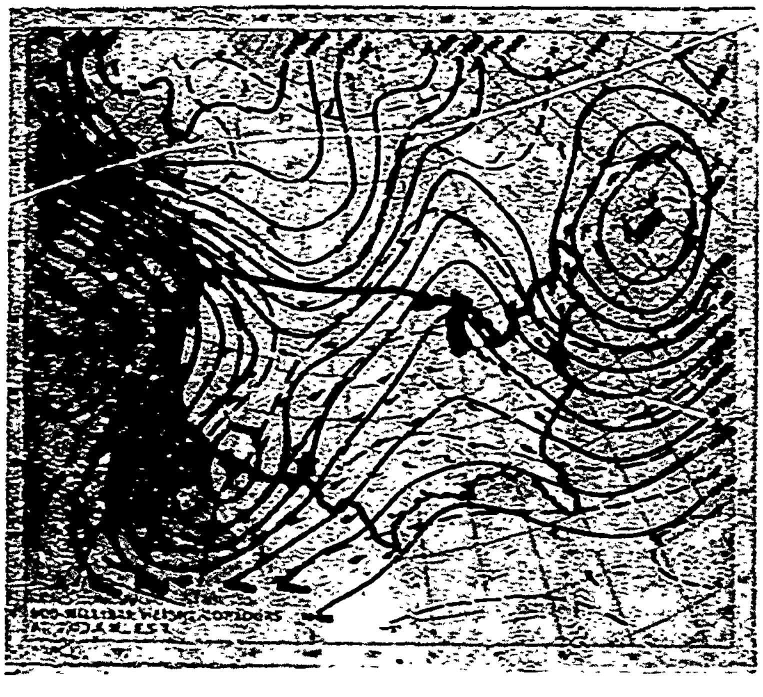


Figure 28b. 500-millibar height contours for 26 March 1977.

TABLE 25. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds			Date: 26 March 1977
				Low %/Type	Mid %/Type	High %/Type	Remarks
0100	14.0	5.8	3.5	0	100 As	-	
0200	13.6	5.7	3.2	0	100 As	-	
0300	13.3	5.7	3.3	0	100 As	-	
0400	12.0	5.3	2.2	0	100 As	-	
0500	11.2	5.4	2.4	0	100 As	-	
0600	11.1	6.1	4.2	80 Sc	20 As	-	
0700	11.0	6.7	5.5	90 Sc	10 Ac	-	Miniverter not switching
0800	10.3	7.8	7.7	100 Sc	-	-	0745 rain began/8mΔT out/ computer stopped
0900	10.4	8.2	8.3	100 Sc	-	-	0819 restarted computer
1000	10.8	9.3	10.2	100 Sc	-	-	0940 rain began
1100	15.6	6.7	5.6	10 Cu	20 Ac	30 Ci	
1200	18.3	5.6	2.2	20 Cu	20 Ac	10 Ci	
1300	18.3	5.6	2.8	30 Cu	20 Ac	10 Ci	
1400	18.3	4.9	1.7	30 Cu	0	0	
1500	16.9	6.1	4.4	50 Cu	0	0	
1600	17.0	6.9	6.2	40 Cu	0	0	
1700	15.3	6.0	4.1	80 Sc	10 Ac	0	
1800	6.8	6.8	5.7	100 Cb	-	-	Light hail and rain began 1745, hail ended 1755, rain ended 1950
1900	5.0	5.7	3.0	100 Sc	-	-	
2000	6.9	5.7	3.2	100 Sc	-	-	Rain began 2050, ended 2135
2100	6.2	6.3	4.5	100 Sc	-	-	
2200	5.9	5.9	3.5	30 Sc	0	0	32m temperature pegs miniverter disconnected, has 1 V/P-P AC noise. Connect surface temperature at 2145
2300	5.5	6.1	3.8	80 Sc	0	0	
2400	5.0	5.8	3.3	60 Sc	0	0	

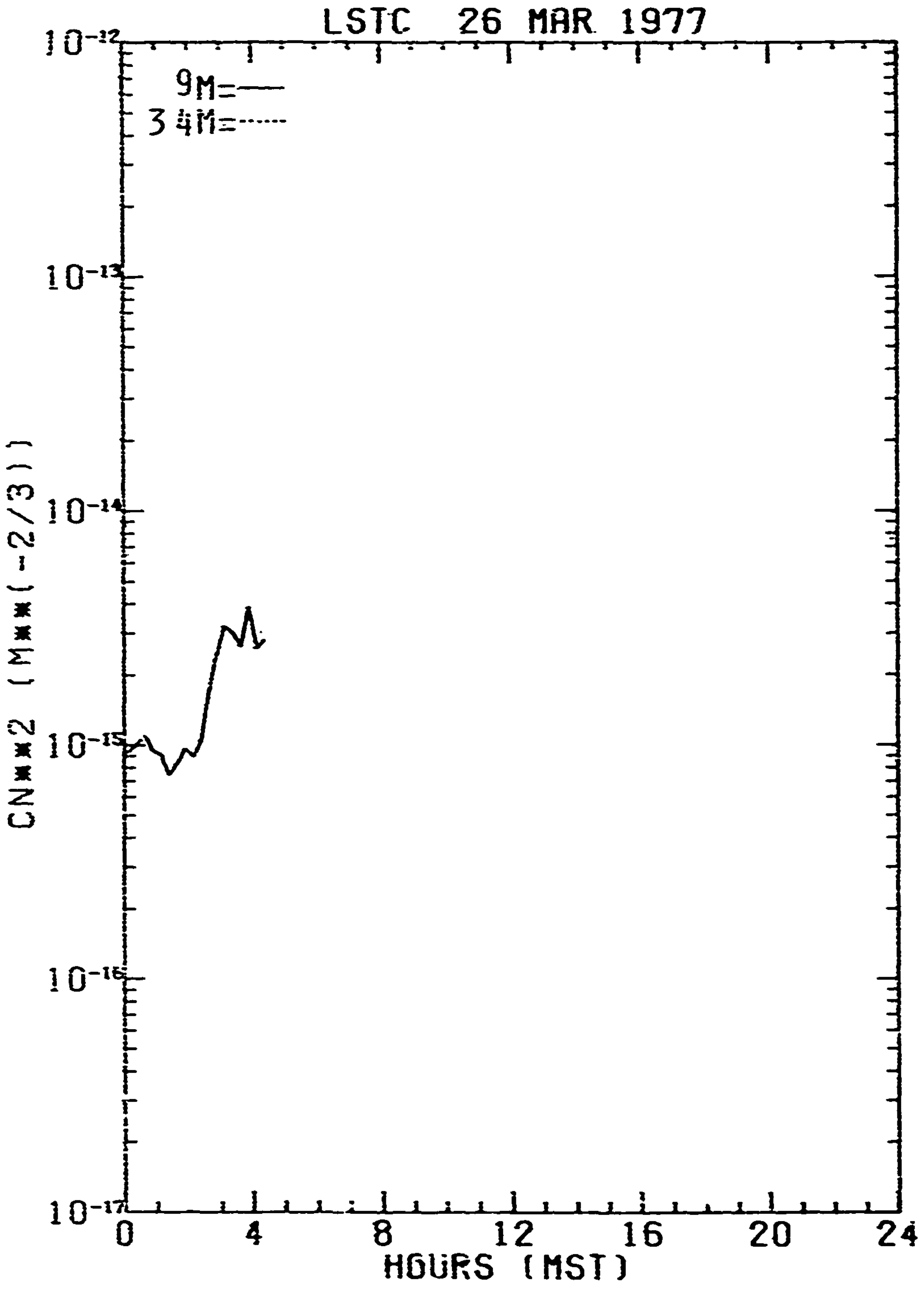


Figure 29. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 26 March 1977.

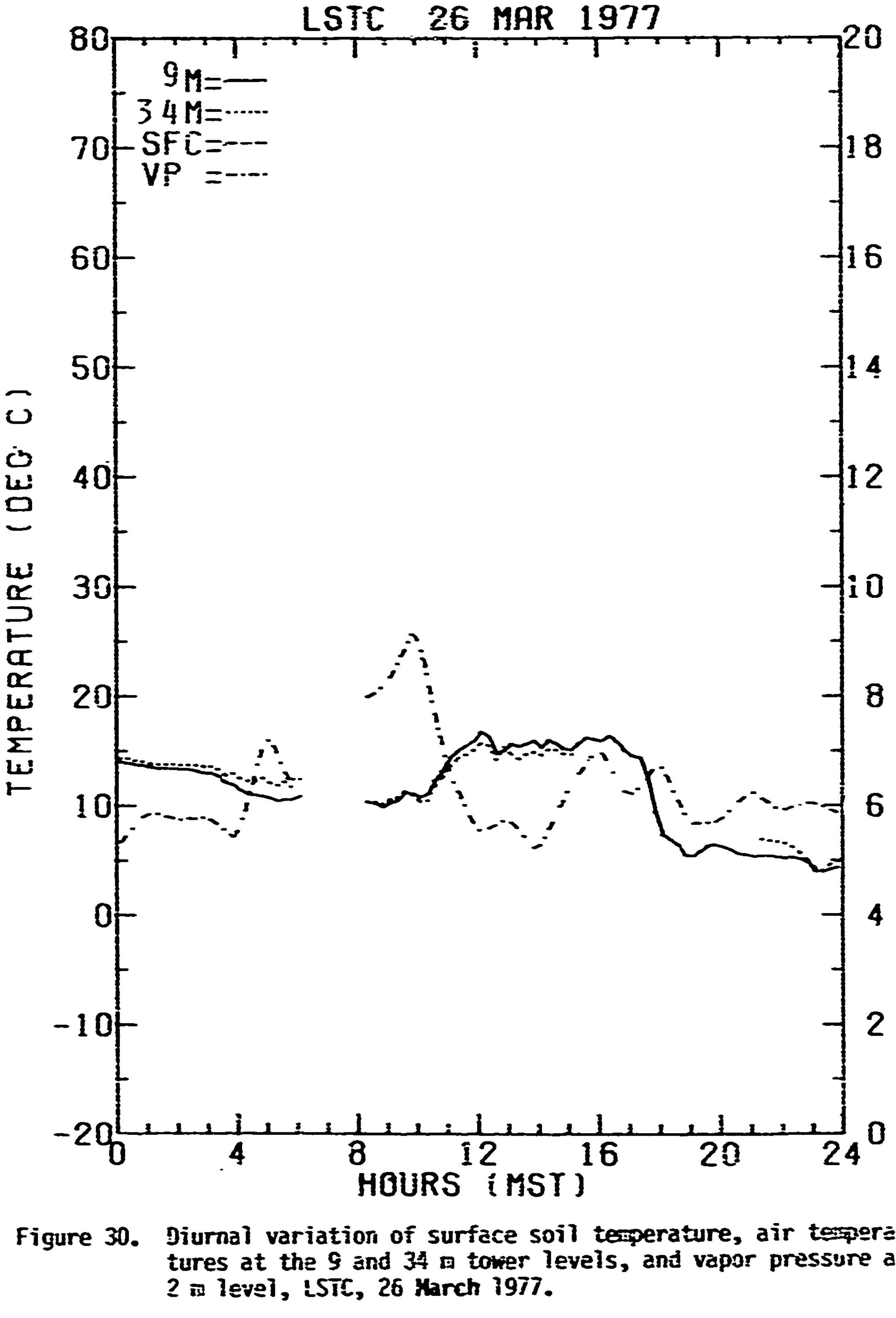


Figure 30. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 26 March 1977.

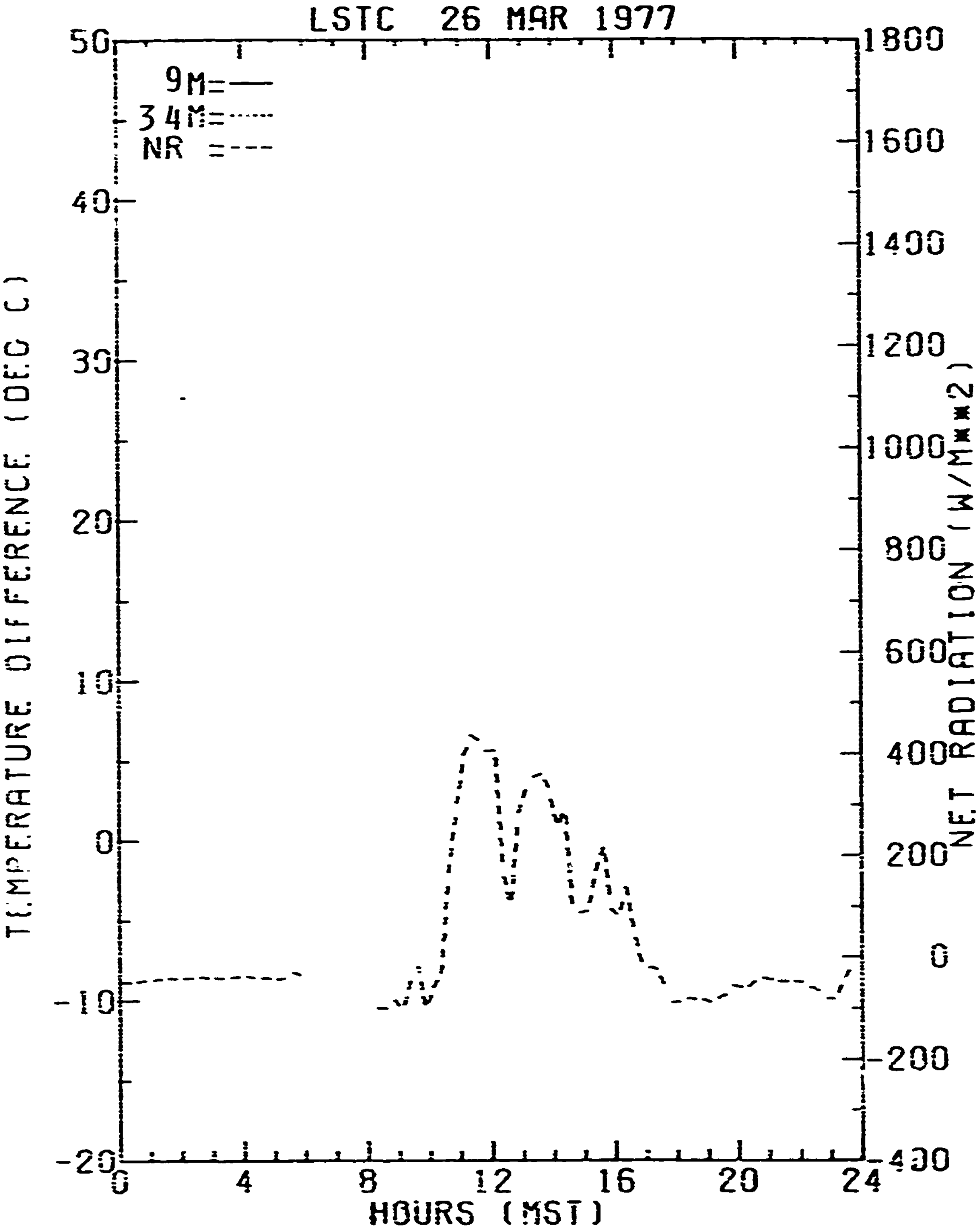


Figure 31. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 26 March 1977.

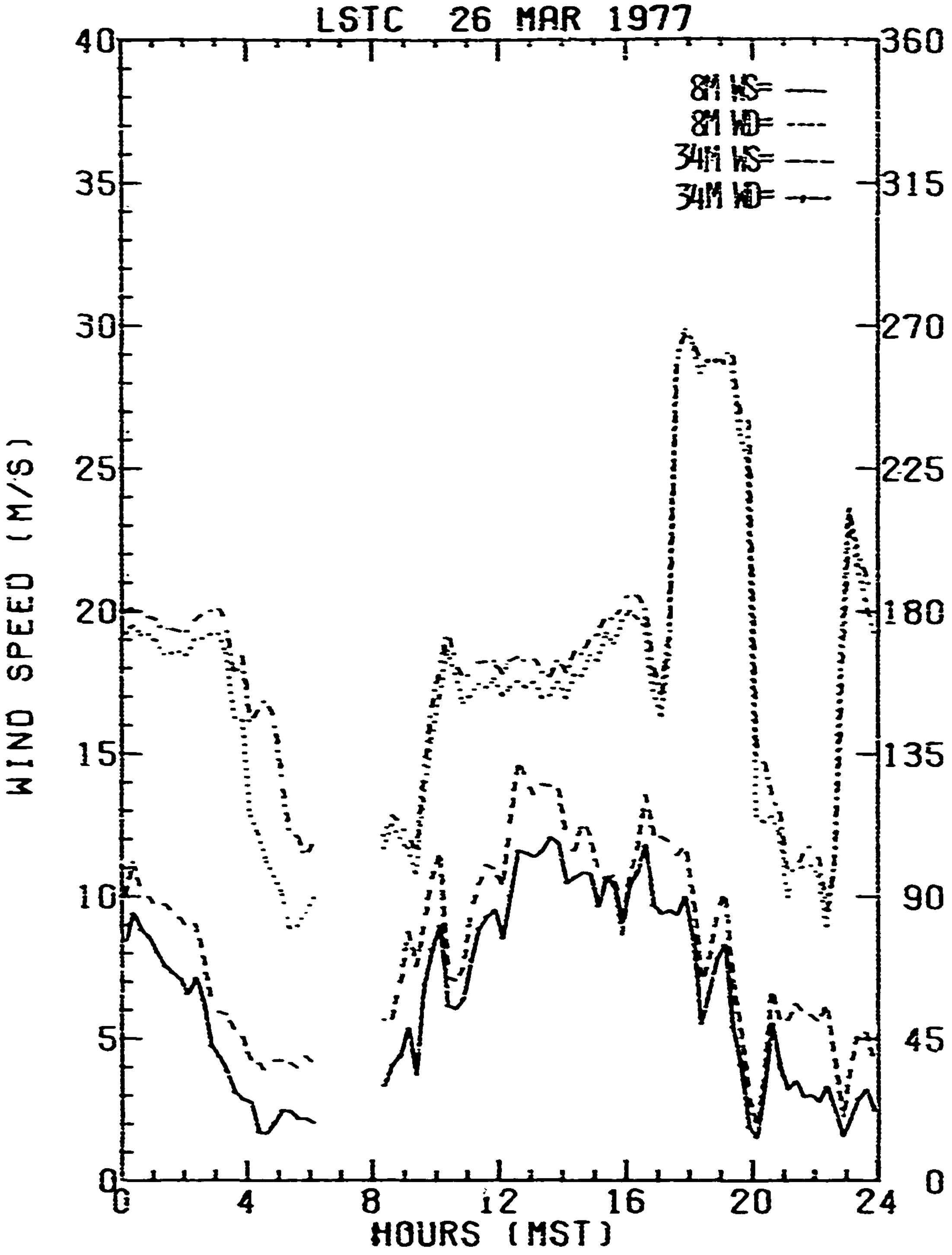


Figure 32. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 26 March 1977.

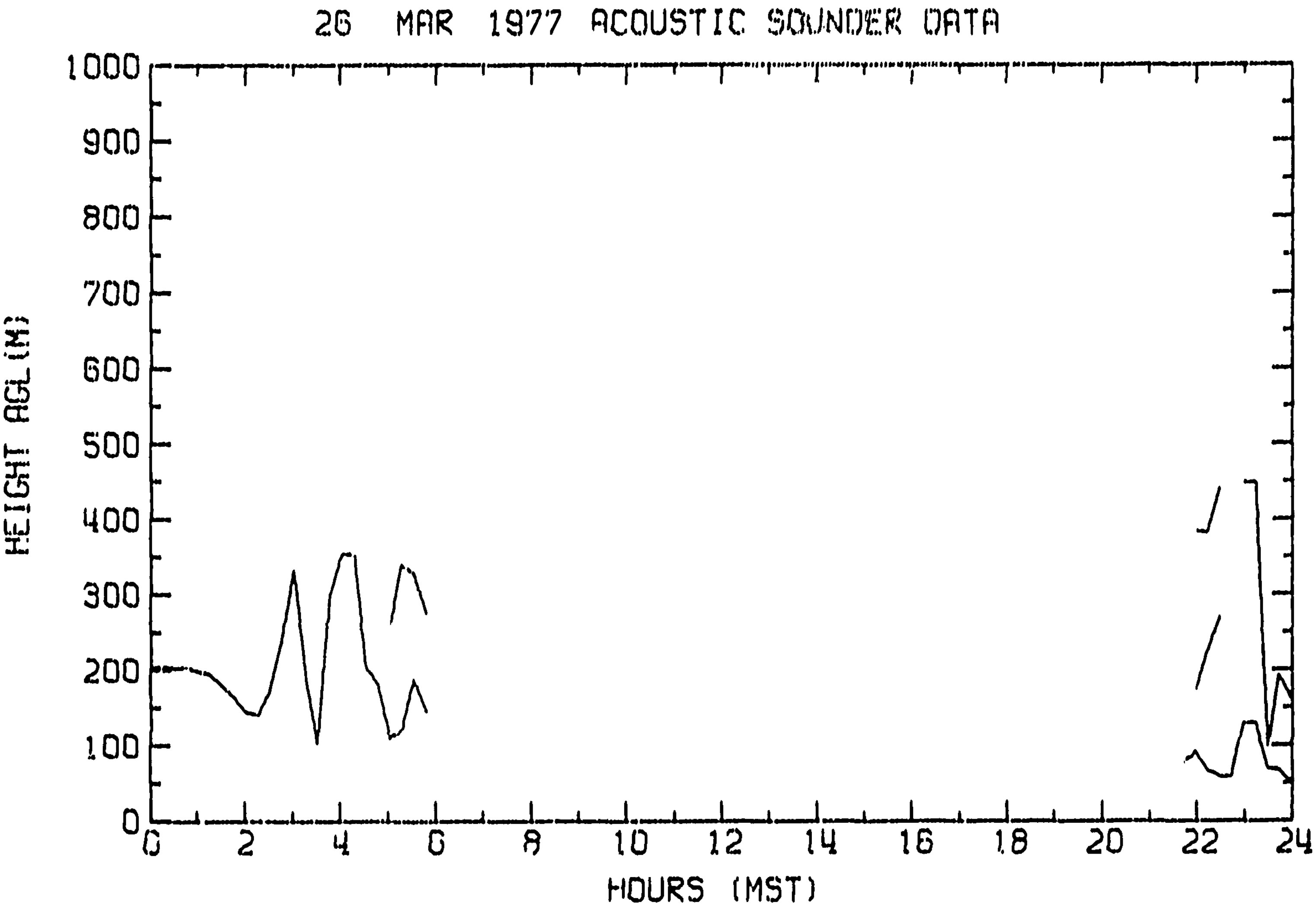


Figure 33. Inversion heights, LSTC, 26 March 1977.

TABLE 26
APACHE SITE RAWINSONDE DATA

DATE: 26 MAR 77 RELEASE NO.: 9 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.8	13.2	4.9	0.0	0.0
212.9	637.5	12.4	4.5	195.8	3.8
1003.8	579.6	6.5	3.5	194.8	13.6
1805.4	525.0	-1.5	2.9	197.8	15.1
2997.3	451.0	-11.1	1.6	211.3	13.9

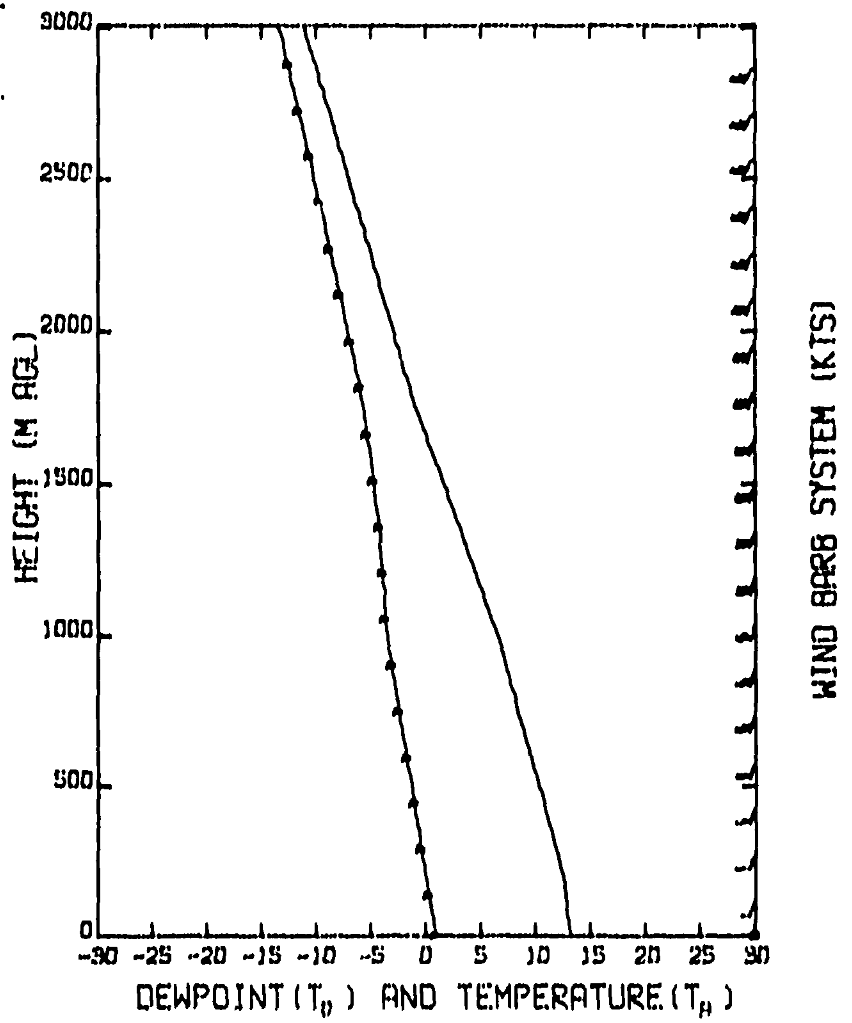
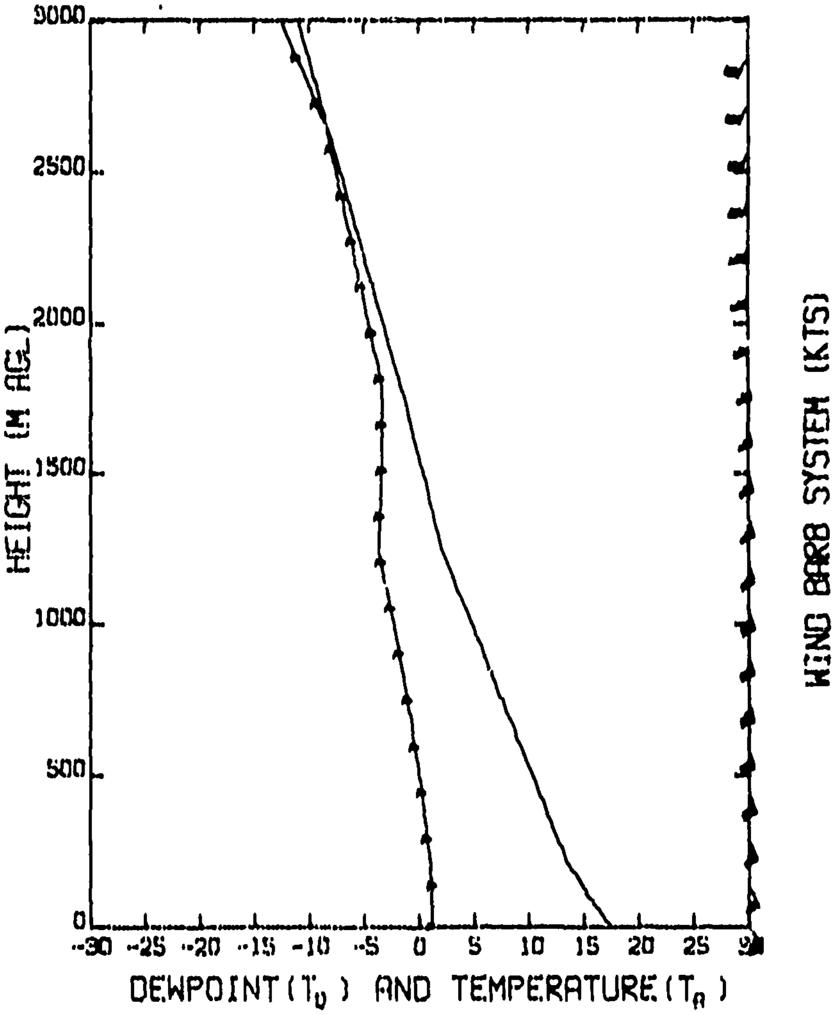


TABLE 27
APACHE SITE RAWINSONDE DATA

DATE: 26 MAR 77 RELEASE NO.: 10 RELEASE TIME: 1225 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	652.8	17.5	5.0	150.0	11.3
201.3	637.5	13.6	4.9	156.9	12.9
1243.0	562.0	2.1	3.5	163.9	12.8
1790.0	525.0	-1.7	3.6	172.4	13.0
2654.3	470.5	-8.4	2.4	200.1	15.7
3274.8	434.1	-13.1	1.3	212.8	18.7



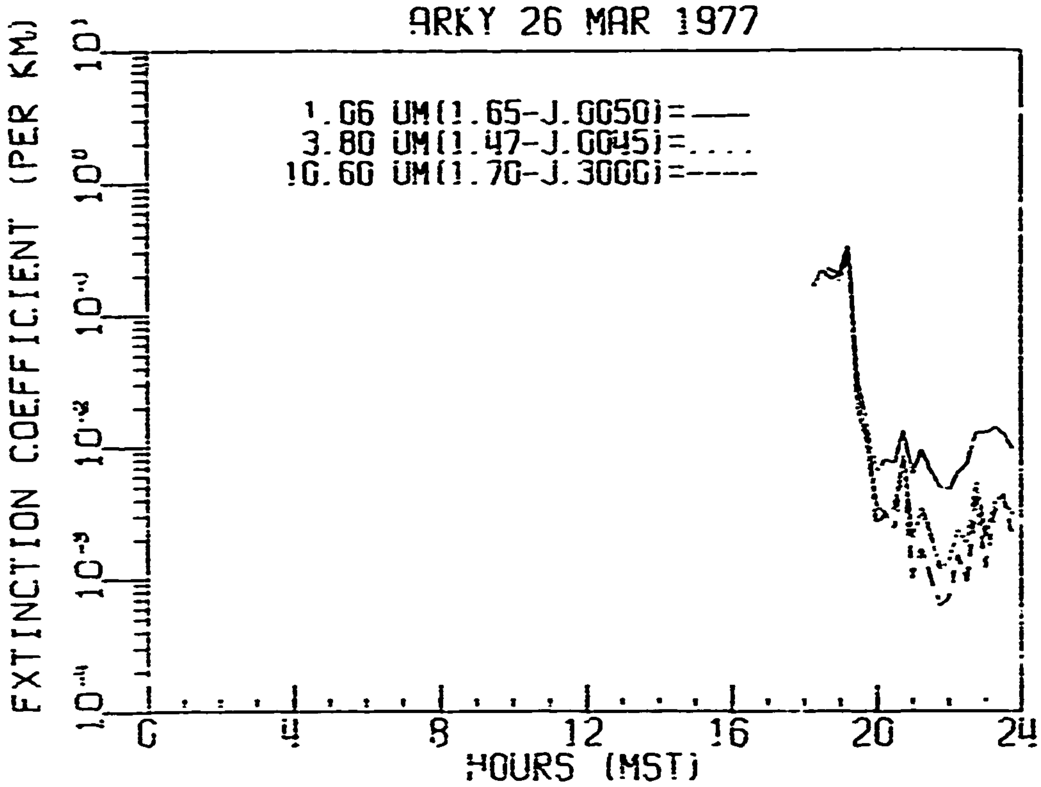


Figure 34. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 26 March 1977.

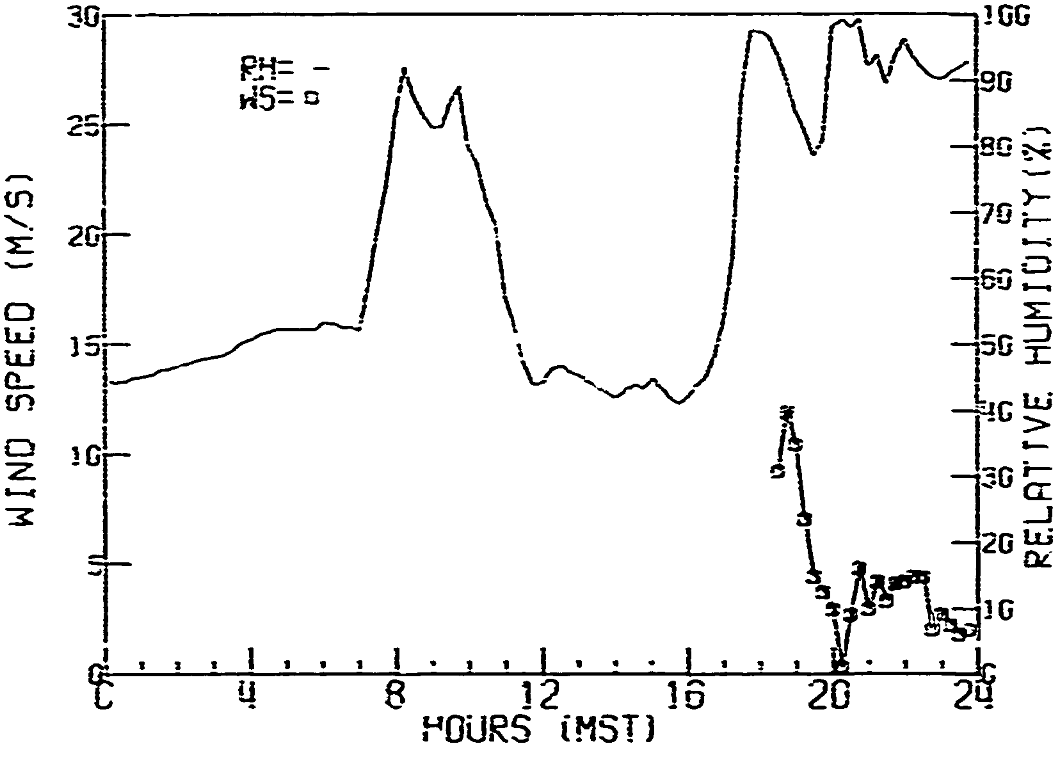


Figure 35. Diurnal variation of windspeed and relative humitity, Arky Site, 26 March 1977.

TABLE 28
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
26 MAR 77														
	18:15:00	900	.14+02	.28+01	.15+01	.42+00	.87+00	.33+00	.00	.00	.21+00	.17+00	.18+00	1895.
	18:30:00	900	.15+02	.33+01	.14+01	.52+00	.13+01	.45+00	.00	.00	.26+00	.22+00	.23+00	2549.
	18:45:00	900	.14+02	.22+01	.19+01	.38+00	.90+00	.34+00	.00	.00	.22+00	.19+00	.19+00	2254.
	19:00:00	900	.89+01	.19+01	.14+01	.29+00	.93+00	.41+00	.00	.00	.23+00	.18+00	.20+00	2270.
	19:15:00	900	.18+02	.37+01	.22+01	.77+00	.14+01	.63+00	.00	.00	.34+00	.30+00	.31+00	3478.
	19:30:00	900	.37+01	.46+00	.23+00	.51-01	.16+00	.25-01	.00	.00	.33-01	.21-01	.22-01	201.
	19:45:00	900	.15+01	.11+00	.61-01	.30-01	.32-01	.26-01	.00	.00	.15-01	.13-01	.12-01	143.
	20:00:00	900	.13+01	.13+00	.41-01	.30-01	.00	.00	.00	.00	.67-02	.37-02	.28-02	26.
	20:15:00	900	.14+01	.14+00	.20-01	.10-01	.32-01	.00	.00	.00	.81-02	.31-02	.31-02	23.
	20:30:00	900	.15+01	.10+00	.13+00	.20-01	.00	.00	.00	.00	.77-02	.35-02	.24-02	24.
	20:45:00	900	.25+01	.26+00	.83-01	.00	.00	.26-01	.00	.00	.13-01	.86-02	.82-02	122.
	21:00:00	900	.15+01	.11+00	.13+00	.00	.00	.00	.00	.00	.63-02	.20-02	.10-02	12.
	21:15:00	900	.18+01	.20+00	.18+00	.00	.00	.00	.00	.00	.96-02	.35-02	.17-02	19.
	21:30:00	900	.12+01	.23+00	.81-01	.00	.00	.00	.00	.00	.57-02	.22-02	.11-02	13.
	21:45:00	900	.11+01	.86-01	.41-01	.00	.00	.00	.00	.00	.50-02	.12-02	.64-03	9.
	22:00:00	900	.96+00	.10+00	.61-01	.00	.00	.00	.00	.00	.48-02	.14-02	.72-03	9.
	22:15:00	900	.12+01	.13+00	.61-01	.10-01	.00	.00	.00	.00	.65-02	.24-02	.15-02	17.
	22:30:00	900	.15+01	.23+00	.41-01	.00	.00	.00	.00	.00	.76-02	.19-02	.95-03	14.
	22:45:00	900	.22+01	.21+00	.18+00	.10-01	.32-01	.00	.00	.00	.13-01	.55-02	.42-02	33.
	23:00:00	900	.31+01	.24+00	.00	.00	.00	.00	.00	.00	.15-01	.21-02	.13-02	24.
	23:15:00	900	.29+01	.24+00	.61-01	.00	.32-01	.00	.00	.00	.14-01	.38-02	.32-02	30.
	23:30:00	900	.24+01	.14+00	.00	.00	.00	.11-01	.00	.00	.13-01	.45-02	.44-02	71.
	23:45:00	900	.20+01	.16+00	.20-01	.20-01	.00	.00	.00	.00	.10-01	.32-02	.23-02	27.

Weather Summary

Date: 27 March 1977

Synoptic

Surface: Weak surface low-pressure area over northeast New Mexico and the panhandle of Texas with cold front extending southward from central Kansas thru Texas.

500 Millibar: Upper air closed low weakening and moving eastward. Closed upper low center moved over El Paso, Texas at 1000-1100 MST with consequent shifting of winds over WSMR from southerly to northerly.

Holloman AFB

Clouds: Mostly cloudy (cumulus) with occasional light drizzle and ceilings 1500 m AGL.

Wind: Southeasterly 5 m sec^{-1} until 1000 MST, southwesterly 4 m sec^{-1} until 1600 MST, and southeasterly 3 m sec^{-1} for the remainder of the day. Peak gust west southwesterly 10 m sec^{-1} shortly before 1300 MST.

Visibility: Generally 40 km lowering to 16 km in light rain showers at 1800 MST.

Remarks: On the west side of the Tularosa Basin, "A" Station reported sustained west northwesterly winds of 13-15 m sec^{-1} with peak gusts in the 23-26 m sec^{-1} range after 1700 MST.

Maximum temperature:	10.6°C	Corresponding vapor pressure:	5.2 Torr
Minimum temperature:	3.9°C	Corresponding vapor pressure:	4.8 Torr

Figure 36a. Surface weather map for 27 March 1977.

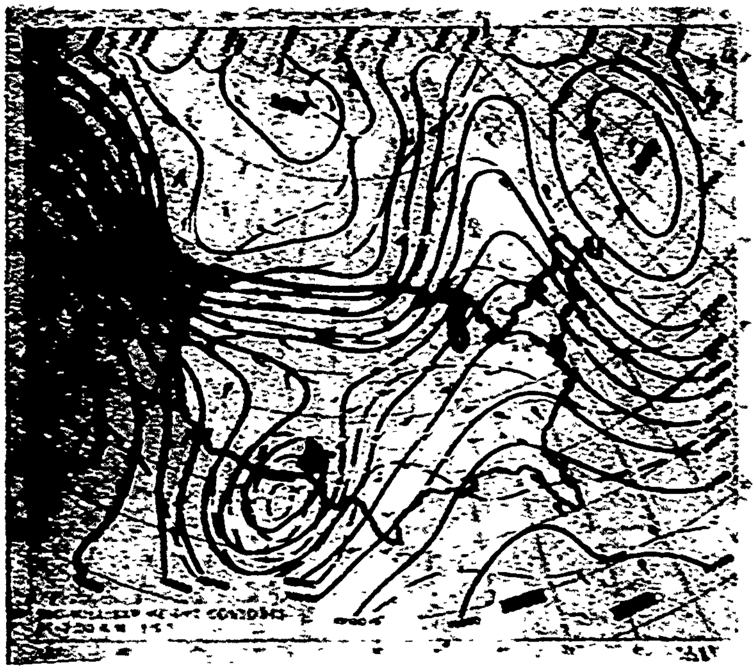


Figure 36b. 500-millibar height contours for 27 March 1977.

TABLE 29. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 27 March 1977 Remarks
0100	4.0	5.7	3.0	10 Sc	0	0	
0200	2.9	5.1	1.4	10 Sc	0	0	
0300	2.1	4.9	1.0	10 Sc	0	0	
0400	2.2	4.6	0.3	20 Sc	0	0	
0500	2.0	4.3	-0.7	20 Sc	0	0	Retrieved data tape from Apache
0600	2.2	4.2	-1.2	20 Sc	0	0	
0700	3.9	4.1	-1.3	20 Sc	0	0	
0800	5.3	4.0	-1.7	20 Sc	0	0	8 m and 32 m ΔT's on line at 0800
0900	7.0	4.9	1.2	50 Cu	0	0	0845 W 32 out 0915 w 32 operational
1000	7.7	4.7	0.7	90 Cu	0	0	V 32 on chart = + on mini-verter = -
1100	9.4	3.6	2.2	100 Cu	0	0	
1200	8.9	3.3	2.8	100 Cu	0	0	
1300	10.1	4.7	0.7	90 Cu	0	0	Apache on - 1233 except 8 m T
1400	9.4	4.5	0.1	90 Cu	0	0	
1500	10.2	4.6	0.3	80 Sc	0	10 Ci	Put up T - 32 m looks bad
1600	10.2	4.6	0.3	100 Sc	0	0	
1700	10.7	4.7	0.8	10 Cu	80 Ac	0	
1800	9.6	5.1	1.8	0	90 Ac	0	

Shut down for weather

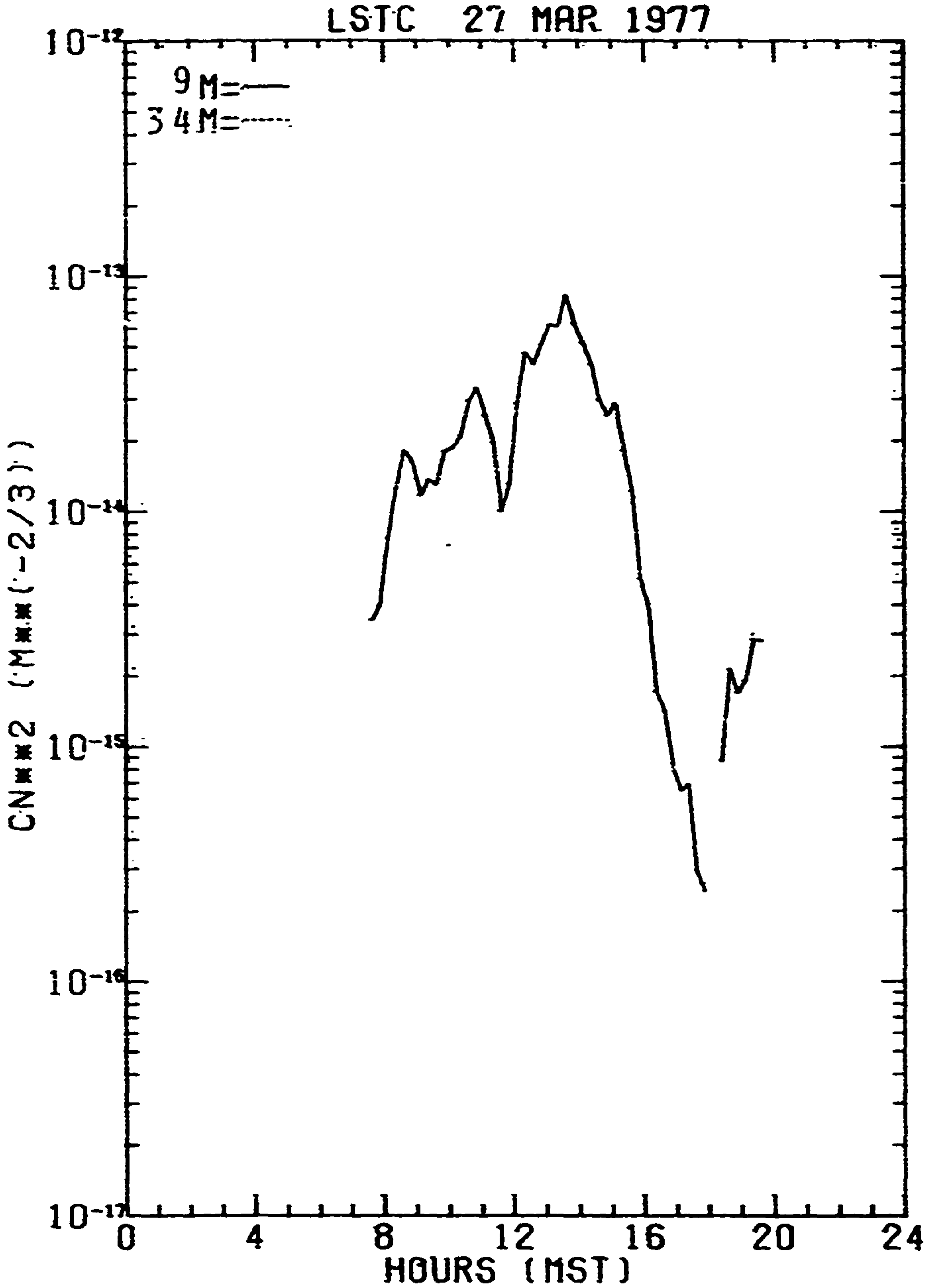


Figure 37. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 27 March 1977.

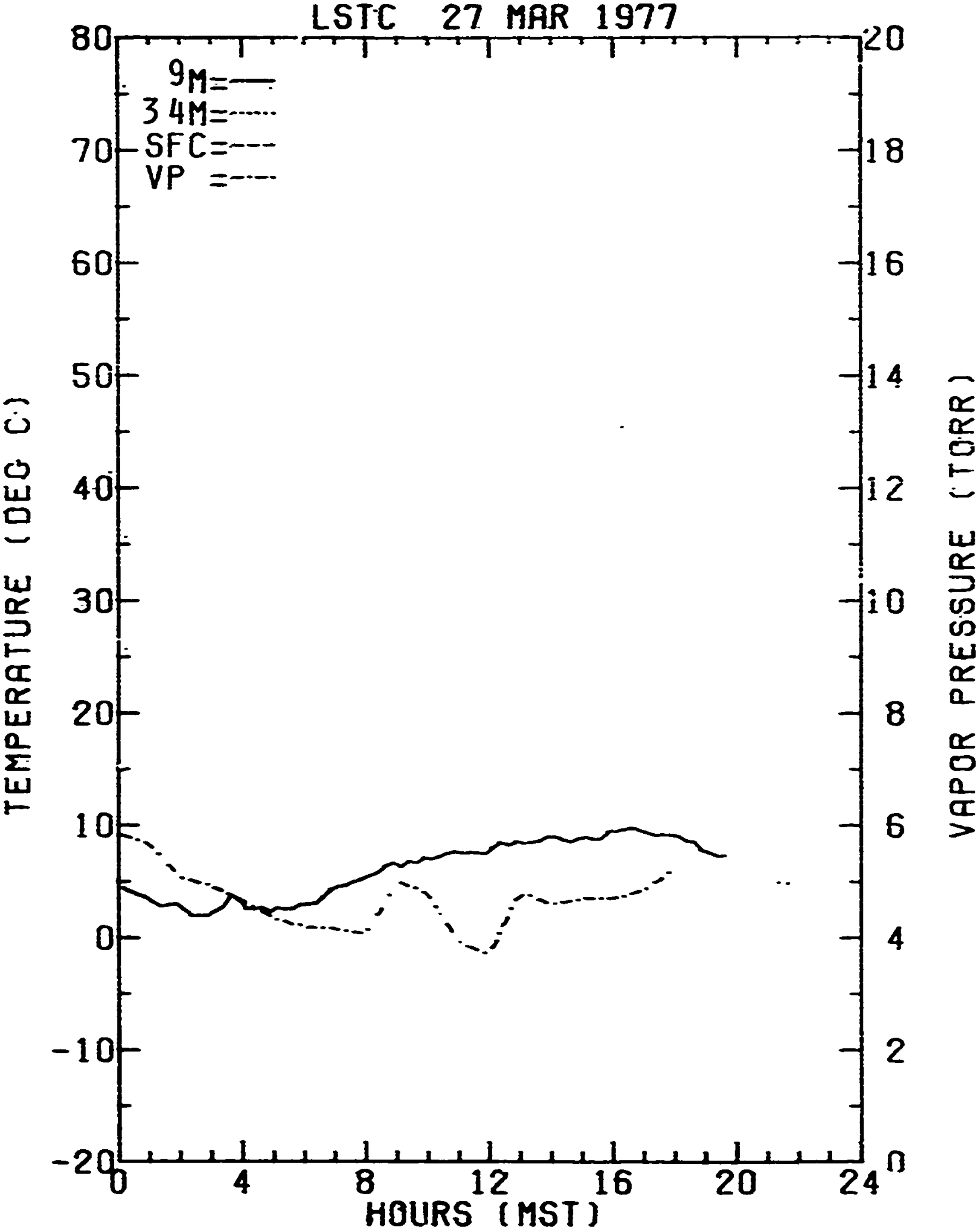


Figure 38. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 27 March 1977.

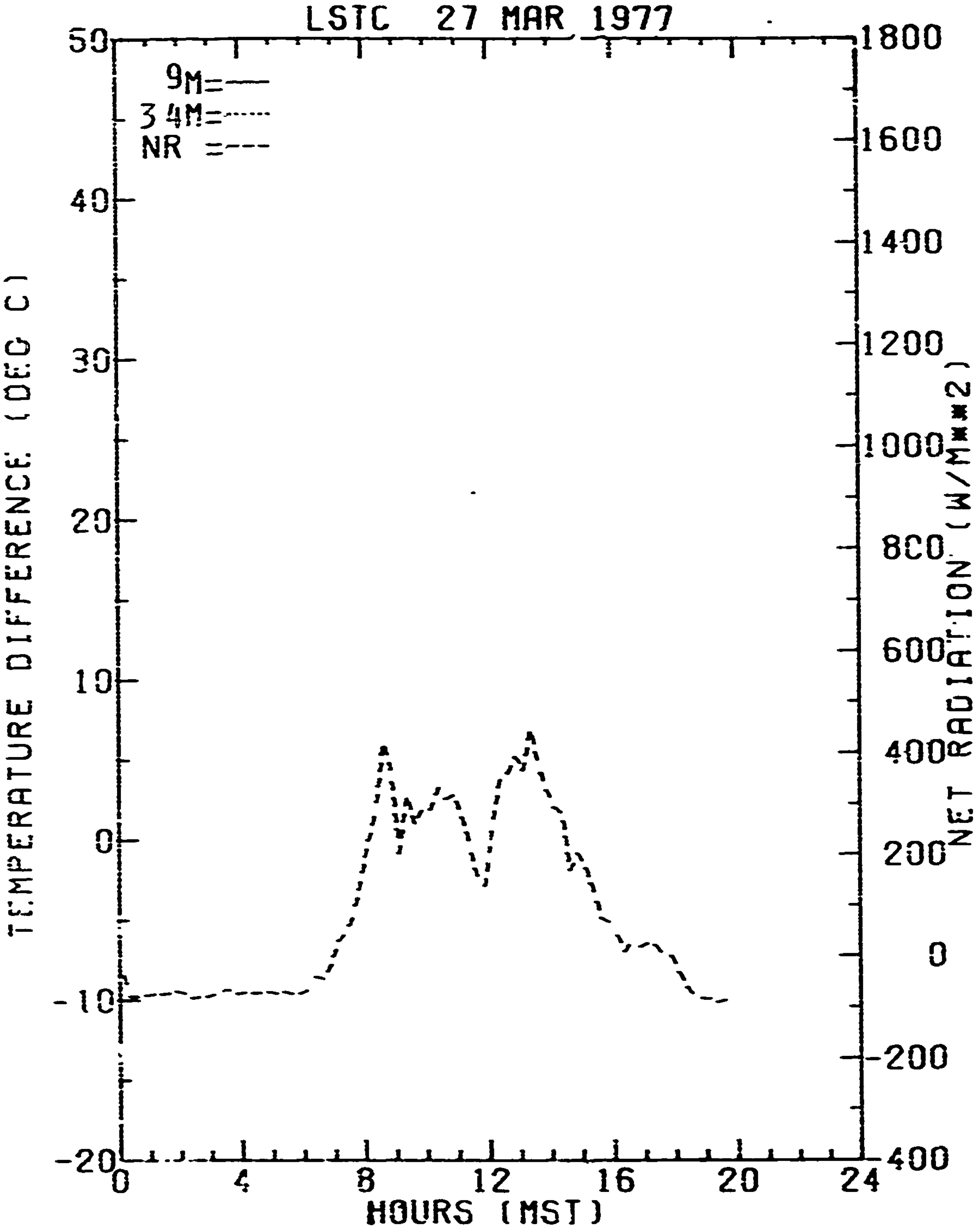


Figure 39. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 27 March 1977.

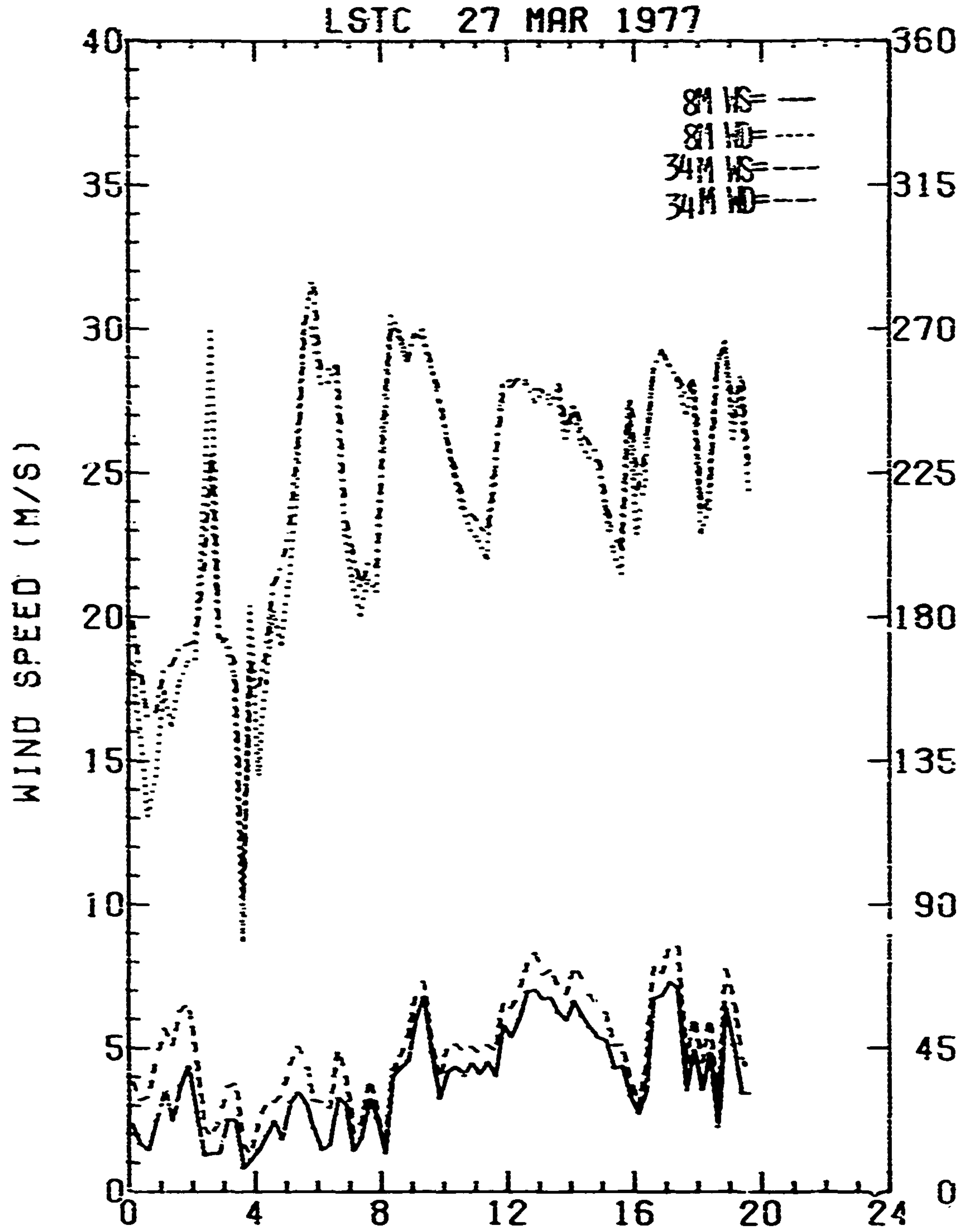


Figure 40. Dirunal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 27 March 1977.

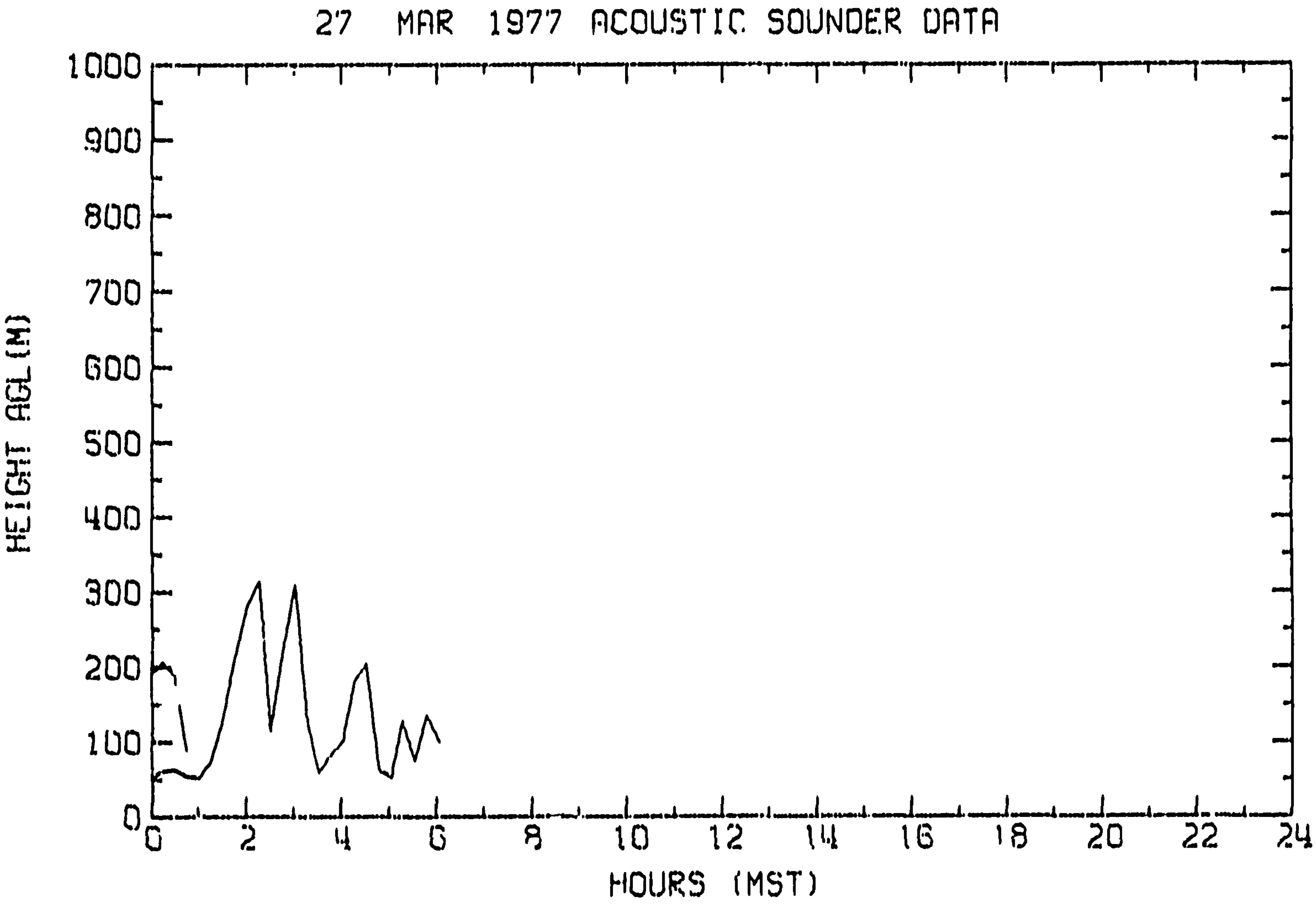


Figure 41. Inversion heights, LSTC, 27 March 1977.

TABLE 30

APACHE SITE RAWINSONDE DATA

DATE: 27 MAR 77 RELEASE NO.: 12 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.7	8.8	4.9	220.0	5.1
207.0	637.5	6.0	3.9	235.8	6.0
1240.7	560.7	-4.2	3.1	260.8	8.6
1757.7	525.0	-7.2	2.1	259.7	6.9
2200.1	495.9	-10.9	1.7	273.7	4.0
2863.0	454.6	-15.6	1.0	294.5	4.7
3077.7	441.9	-16.6	0.7	278.6	5.2

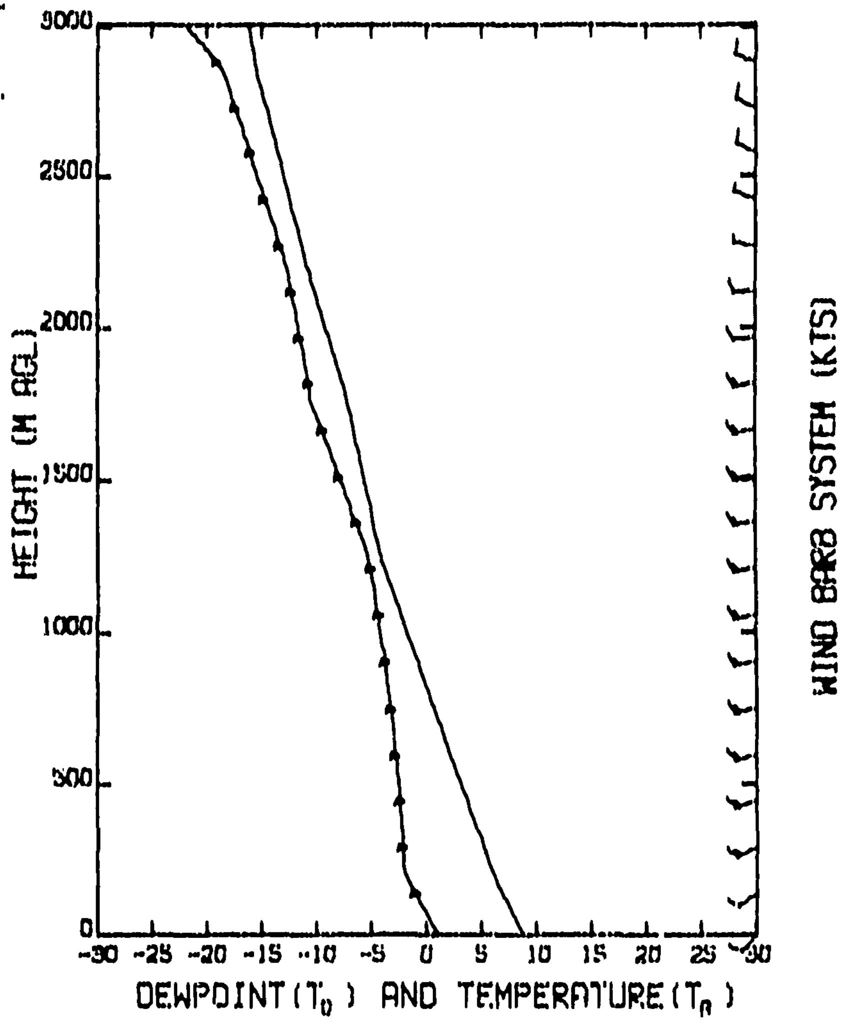
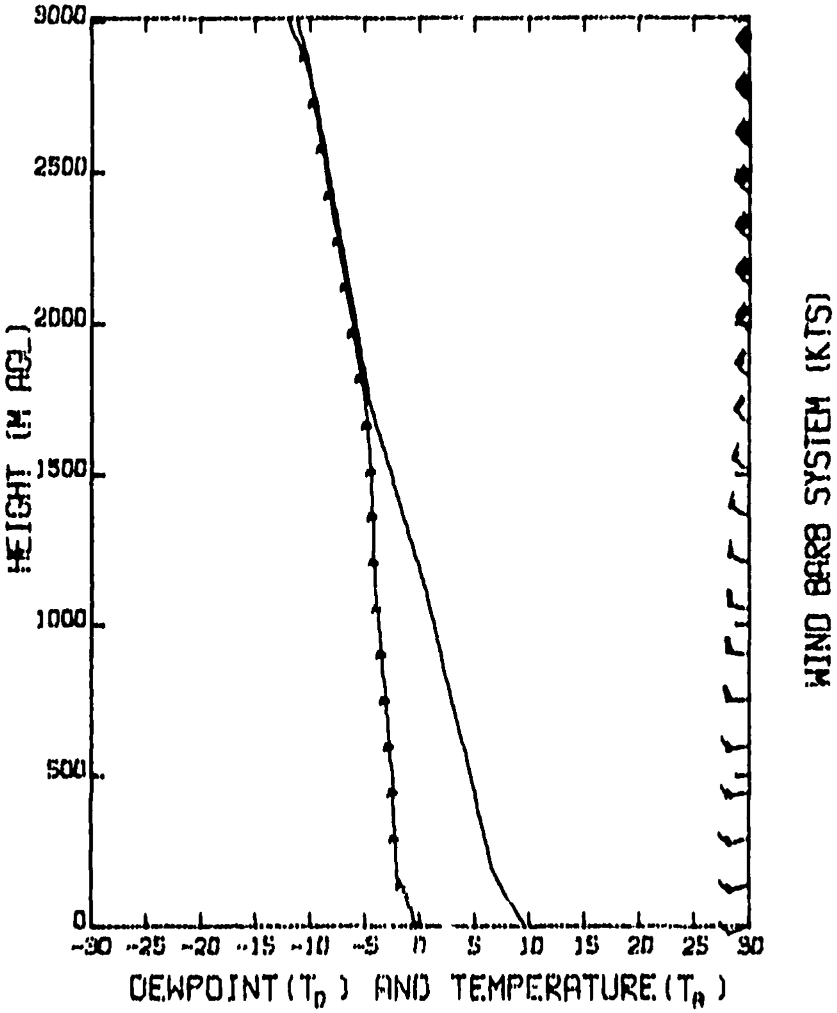


TABLE 31
APACHE SITE RAWINSONDE DATA

DATE: 27 MAR 77 RELEASE NO. 13 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	650.8	9.6	4.5	250.0	6.2
170.4	637.5	6.8	3.9	252.8	6.5
1152.3	565.0	0.2	3.4	289.6	8.9
1736.8	525.0	-4.6	3.2	321.5	10.5
2859.3	454.7	-10.2	2.1	326.2	24.2
3423.5	422.5	-14.1	1.2	338.3	22.5



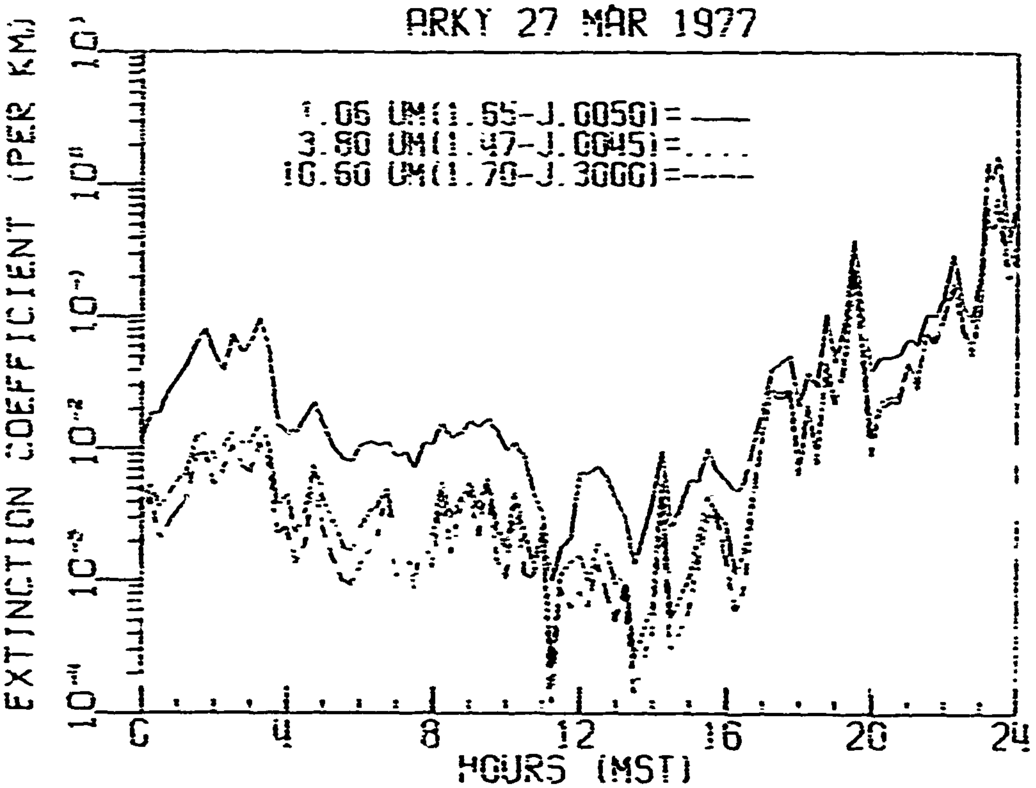


Figure 42. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 27 March 1977.

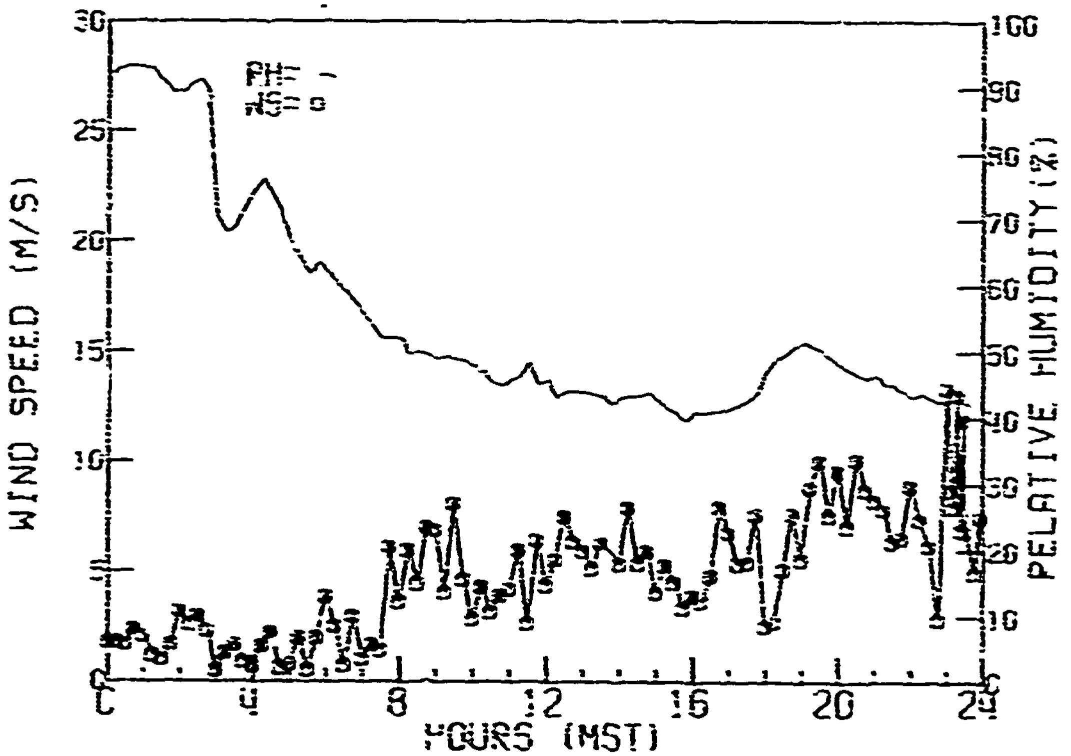


Figure 43. Diurnal variation of windspeed and relative humidity, Arky Site, 27 March 1977.

TABLE 32
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
27 MAR 77													
00:00:00	900	.21+01	.39+00	.81-01	.00	.32-01	.00	.00	.00	.11-01	.35-02	.30-02	24.
00:15:00	899	.35+01	.31+00	.13+00	.10-01	.32-01	.00	.00	.00	.19-01	.55-02	.44-02	42.
00:30:00	900	.45+01	.21+00	.10+00	.00	.00	.00	.00	.00	.19-01	.37-02	.21-02	35.
00:45:00	899	.63+01	.26+00	.81-01	.00	.00	.00	.00	.00	.28-01	.45-02	.29-02	53.
01:00:00	900	.44+01	.26+00	.14+00	.00	.00	.00	.00	.00	.35-01	.58-02	.35-02	62.
01:15:00	899	.13+02	.43+00	.81-01	.00	.00	.00	.00	.00	.44-01	.65-02	.41-02	77.
01:30:00	900	.15+02	.40+00	.10+00	.20-01	.32-01	.00	.00	.00	.65-01	.12-01	.90-02	127.
01:45:00	899	.23+02	.34+00	.22+00	.10-01	.32-01	.00	.00	.00	.81-01	.13-01	.77-02	152.
02:00:00	900	.12+02	.44+00	.16+00	.10-01	.00	.00	.00	.00	.51-01	.83-02	.54-02	94.
02:15:00	899	.83+01	.53+00	.33+00	.10-01	.32-01	.00	.00	.00	.59-01	.10-01	.70-02	90.
02:30:00	900	.17+02	.56+00	.16+00	.10-01	.64-01	.00	.00	.00	.74-01	.14-01	.11-01	143.
02:45:00	899	.13+02	.43+00	.24+00	.10-01	.32-01	.00	.00	.00	.55-01	.11-01	.79-02	107.
03:00:00	900	.94+01	.63+00	.24+00	.00	.00	.00	.00	.00	.65-01	.11-01	.67-02	116.
03:15:00	899	.28+02	.47+00	.25+00	.10-01	.32-01	.00	.00	.00	.98-01	.15-01	.11-01	191.
03:30:00	900	.13+02	.49+00	.12+00	.20-01	.32-01	.00	.00	.00	.98-01	.11-01	.83-02	116.
03:45:00	899	.13+01	.30+00	.61-01	.10-01	.00	.00	.00	.00	.16-01	.39-02	.24-02	33.
04:00:00	900	.25+01	.34+00	.12+00	.10-01	.00	.00	.00	.00	.13-01	.45-02	.26-02	30.
04:15:00	899	.33+01	.26+00	.20-01	.00	.00	.00	.00	.00	.13-01	.24-02	.14-02	24.
04:30:00	900	.47+01	.30+00	.61-01	.00	.00	.00	.00	.00	.18-01	.30-02	.19-02	33.
04:45:00	899	.44+01	.31+00	.81-01	.10-01	.00	.13-01	.00	.00	.23-01	.75-02	.63-02	94.
05:00:00	900	.33+01	.31+00	.81-01	.10-01	.00	.00	.00	.00	.16-01	.31-02	.25-02	33.
05:15:00	899	.22+01	.10+00	.14+00	.00	.00	.00	.00	.00	.10-01	.30-02	.15-02	22.
05:30:00	900	.19+01	.34+00	.61-01	.00	.00	.00	.00	.00	.86-02	.19-02	.11-02	16.
05:45:00	899	.19+01	.18+00	.41-01	.00	.00	.00	.00	.00	.81-02	.17-02	.73-03	15.
06:00:00	900	.22+01	.33+00	.41-01	.00	.00	.00	.00	.00	.11-01	.25-02	.13-02	20.
06:15:00	899	.22+01	.37+00	.13+00	.00	.00	.00	.00	.00	.12-01	.35-02	.17-02	22.
06:30:00	900	.21+01	.17+00	.14+00	.10-01	.00	.00	.00	.00	.11-01	.38-02	.22-02	25.
06:45:00	899	.19+01	.12+00	.41-01	.30-01	.32-01	.00	.00	.00	.11-01	.51-02	.47-02	39.
07:00:00	900	.20+01	.14+00	.61-01	.00	.00	.00	.00	.00	.89-02	.20-02	.11-02	16.
07:15:00	899	.17+01	.19+00	[illegible]	.00	.32-01	.00	.00	.00	.95-02	.23-02	.75-02	21.
07:30:00	900	.16+01	.16+00	.41-01	.00	.00	.00	.00	.00	.73-02	.16-02	.88-03	13.
07:45:00	899	.21+01	.10+00	.00	.00	.32-01	.00	.00	.00	.11-01	.25-02	.76-02	24.
08:00:00	900	.29+01	.10+00	.41-01	.00	.00	.00	.00	.00	.11-01	.22-02	.12-02	20.
08:15:00	899	.33+01	.14+00	.91-01	.00	.00	.13-01	.00	.00	.16-01	.57-02	.50-02	77.
08:30:00	900	.27+01	.16+00	.10+00	.00	.00	.00	.00	.00	.12-01	.30-02	.16-02	23.
08:45:00	899	.25+01	.20+00	.41-01	.10-01	.32-01	.00	.00	.00	.13-01	.47-02	.37-02	33.
09:00:00	900	.31+01	.19+00	.61-01	.00	.00	.13-01	.00	.00	.16-01	.56-02	.50-02	78.
09:15:00	899	.32+01	.21+00	.61-01	.10-01	.00	.00	.00	.00	.15-01	.35-02	.22-02	31.
09:30:00	900	.32+01	.24+00	.25-01	.10-01	.00	.13-01	.00	.00	.17-01	.62-02	.56-02	84.
09:45:00	899	.32+01	.11+00	.81-01	.00	.00	.00	.00	.00	.14-01	.25-02	.15-02	25.
10:00:00	900	.23+01	.14+00	.20-01	.00	.00	.00	.00	.00	.10-01	.18-02	.10-02	18.

TABLE 32 (Cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
27 MAR 77														
	10:15:00	900	.18+01	.16+00	.41-01	.00	.00	.13-01	.00	.00	.31-01	.48-02	.45-02	69.
	10:30:00	900	.19+01	.16+00	.81-01	.00	.00	.00	.00	.00	.88-02	.22-02	.12-02	16.
	10:45:00	900	.98+00	.57-01	.00	.10-01	.00	.00	.00	.00	.47-02	.14-02	.11-02	13.
	11:00:00	900	.29+01	.77-01	.20-01	.10-01	.32-01	.00	.00	.00	.32-02	.24-02	.26-02	15.
	11:15:00	900	.26+00	.43-01	.00	.00	.00	.00	.00	.00	.10-02	.23-03	.12-03	2.
	11:30:00	900	.76+00	.14-01	.20-01	.13-01	.00	.00	.00	.00	.18-02	.12-02	.99-03	9.
	11:45:00	900	.28+00	.43-01	.10+00	.00	.00	.00	.00	.00	.22-02	.14-02	.63-03	5.
	12:00:00	900	.11+01	.86-01	.41-01	.00	.00	.00	.00	.00	.65-02	.16-02	.53-03	12.
	12:15:00	900	.17+01	.29-01	.26-01	.00	.00	.00	.00	.00	.68-02	.99-03	.63-03	12.
	12:30:00	900	.13+01	.85-01	.20-01	.10-01	.00	.00	.00	.00	.74-02	.19-02	.14-02	19.
	12:45:00	900	.12+01	.19+00	.41-01	.00	.00	.00	.00	.00	.61-02	.16-02	.82-03	11.
	13:00:00	900	.89+00	.13+00	.20-01	.00	.00	.00	.00	.00	.42-02	.94-03	.50-03	9.
	13:15:00	900	.58+00	.83-01	.00	.10-01	.00	.00	.00	.00	.31-02	.12-02	.52-03	10.
	13:30:00	900	.28+00	.43-01	.00	.00	.00	.00	.00	.00	.13-02	.26-03	.14-03	2.
	14:00:00	900	.10+01	.14-01	.26-01	.00	.00	.00	.00	.00	.41-02	.60-03	.41-03	7.
	14:15:00	900	.15+01	.19+00	.44-01	.51-01	.00	.00	.00	.00	.13-01	.56-02	.44-02	42.
	14:30:00	900	.62+00	.14-01	.20-01	.00	.00	.00	.00	.00	.26-02	.53-03	.30-03	5.
	14:45:00	900	.81+00	.57-01	.20-01	.00	.00	.00	.00	.00	.36-02	.75-03	.42-03	7.
	15:00:00	900	.13+01	.86-01	.26-01	.00	.00	.00	.00	.00	.59-02	.13-02	.62-03	11.
	15:15:00	900	.13+01	.21+00	.20-01	.13-01	.00	.00	.00	.00	.59-02	.22-02	.14-02	16.
	15:30:00	900	.18+01	.20+00	.61-01	.30-01	.00	.00	.00	.00	.10-01	.45-02	.32-02	33.
	15:45:00	900	.11+01	.13+00	.61-01	.13-01	.32-01	.00	.00	.00	.73-02	.37-02	.31-02	21.
	16:00:00	900	.89+00	.20+00	.81-01	.10-01	.00	.00	.00	.00	.58-02	.28-02	.16-02	16.
	16:15:00	900	.12+01	[illegible]	.20-01	.00	.00	.00	.00	.00	.49-02	.11-02	.60-03	9.
	16:30:00	900	.11+01	.30+00	.81-01	.00	.00	.00	.00	.00	.57-02	.17-02	.87-03	11.
	16:45:00	900	.17+01	.30+00	.12+00	.10-01	.32-01	.00	.00	.00	.11-01	.50-02	.39-02	30.
	17:00:00	900	.21+01	.44+00	.14+00	.51-01	.64-01	.13-01	.00	.00	.20-01	.13-01	.12-01	117.
	17:15:00	900	.39+01	.74+00	.25+00	.81-01	.95-01	.52-01	.00	.00	.41-01	.29-01	.28-01	320.
	17:30:00	900	.57+01	.13+01	.41+00	.10+00	.22+00	.00	.00	.00	.46-01	.26-01	.24-01	162.
	17:45:00	900	.65+01	.12+01	.47+00	.53-01	.15+00	.37-01	.00	.00	.42-01	.29-01	.27-01	279.
	18:00:00	900	.40+01	.26+00	.16+00	.10-01	.64-01	.00	.00	.00	.21-01	.72-02	.64-02	51.
	18:15:00	900	.53+01	.30+00	.19+00	.10-01	.64-01	.57-01	.00	.00	.38-01	.22-01	.22-01	296.
	18:30:00	900	.59+01	.80+00	.14+00	.20-01	.64-01	.00	.00	.00	.30-01	.91-02	.78-02	71.
	18:45:00	900	.19+02	.24+01	.91+00	.15+00	.15+00	.11-01	.00	.00	.11+00	.47-01	.36-01	346.
	19:00:00	900	.69+01	.44+00	.26+00	.40-01	.16+00	.26-01	.00	.00	.45-01	.22-01	.22-01	218.
	19:15:00	900	.15+02	.18+01	.73+00	.16+00	.22+00	.25-01	.00	.00	.93-01	.46-01	.40-01	367.
	19:30:00	900	.49+02	.91+01	.39+01	.66+00	.80+00	.28+00	.00	.00	.40+00	.24+00	.21+00	2178.
	19:45:00	900	.12+02	.15+01	.85+00	.13+00	.32+00	.65-01	.00	.00	.93-01	.54-01	.51-01	505.
	20:00:00	900	.79+01	.64+00	.18+00	.20-01	.00	.13-01	.00	.00	.40-01	.12-01	.90-02	130.
	20:15:00	900	.61+01	.77+00	.19+00	.43-01	.00	.52-01	.00	.00	.51-01	.23-01	.21-01	305.
	20:30:00	900	.78+01	.72+00	.34+00	.71-01	.13+00	.26-01	.00	.00	.51-01	.25-01	.24-01	240.

TABLE 32 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ANKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
27 MAR 77														
	20:49:00	900	.84+01	.87+00	.39+00	.30-01	.96-01	.39-01	.00	.00	.54-01	.26-01	.23-01	272.
	21:00:00	900	.71+01	.87+00	.37+00	.91-01	.32-01	.12+00	.00	.00	.69-01	.45-01	.45-01	619.
	21:15:00	900	.87+01	.13+01	.55+00	.81-01	.13+00	.39-01	.00	.00	.63-01	.34-01	.30-01	317.
	21:30:30	900	.99+01	.15+01	.79+00	.24+00	.27+00	.11+00	.00	.00	.11+00	.79-01	.76-01	879.
	21:45:00	900	.11+02	.19+01	.97+00	.13+00	.26+00	.12+00	.00	.00	.10+00	.68-01	.65-01	723.
	22:00:00	900	.14+02	.25+01	.13+01	.34+00	.51+00	.13+00	.00	.00	.15+00	.10+00	.10+00	987.
	22:15:00	900	.35+02	.72+01	.36+01	.55+00	.71+00	.21+00	.00	.00	.30+00	.19+00	.17+00	1692.
	22:30:00	900	.12+02	.21+01	.12+01	.21+00	.17+00	.17+00	.00	.00	.12+00	.88-01	.92-01	993.
	22:45:00	900	.11+02	.22+01	.77+00	.16+00	.19+00	.79-01	.00	.00	.93-01	.58-01	.52-01	565.
	23:00:00	900	.27+02	.51+01	.22+01	.44+00	.61+00	.13+00	.00	.00	.22+00	.13+00	.12+00	1085.
	23:07:05	425	.14+03	.23+02	.71+01	.14+01	.17+01	.82+00	.00	.00	.97+00	.48+00	.41+00	4234.
	23:11:25	258	.24+03	.32+02	.11+02	.23+01	.17+01	.57+00	.00	.00	.15+01	.73+00	.57+00	6254.
	23:17:48	379	.16+03	.26+02	.96+01	.11+01	.18+01	.72+00	.00	.00	.11+01	.57+00	.49+00	5501.
	23:21:32	293	.21+03	.33+02	.12+02	.16+01	.17+01	.41+00	.00	.00	.13+01	.52+00	.49+00	5148.
	23:26:24	232	.26+03	.40+02	.15+02	.20+01	.25+01	.76+00	.00	.00	.17+01	.83+00	.68+00	7321.
	23:31:07	263	.23+03	.37+02	.13+02	.17+01	.21+01	.67+00	.00	.00	.15+01	.72+00	.59+00	6391.
	23:45:00	893	.46+02	.90+01	.41+01	.79+00	.10+01	.17+00	.00	.00	.38+00	.23+00	.20+00	1830.
	23:55:29	588	.85+02	.15+02	.65+01	.94+00	.81+00	.31+00	.00	.00	.63+00	.34+00	.27+00	2943.

Weather Summary

Date: 28 March 1977

Synoptic

Surface: Low-pressure area over eastern Colorado and Kansas with cold front extending southwestward from eastern Colorado thru northwest New Mexico.

500 Millibar: Closed low over Oklahoma and near cutoff low over western Montana. General northwest winds over New Mexico.

Holloman AFB

Clouds: Scattered low (cumulus) and middle (altocumulus) clouds at 1800 m and 3000 m AGL, respectively.

Wind: Generally westerly and southwesterly 10 m sec^{-1} with peak gust of 16 m sec^{-1} around noon.

Visibility: Generally 50 km in the morning, 30 km in the afternoon.

Maximum temperature:	18.3°C	Corresponding vapor pressure:	3.9 Torr
Minimum temperature:	3.9°C	Corresponding vapor pressure:	4.4 Torr

Figure 44a. Surface weather map for 28 March 1977.

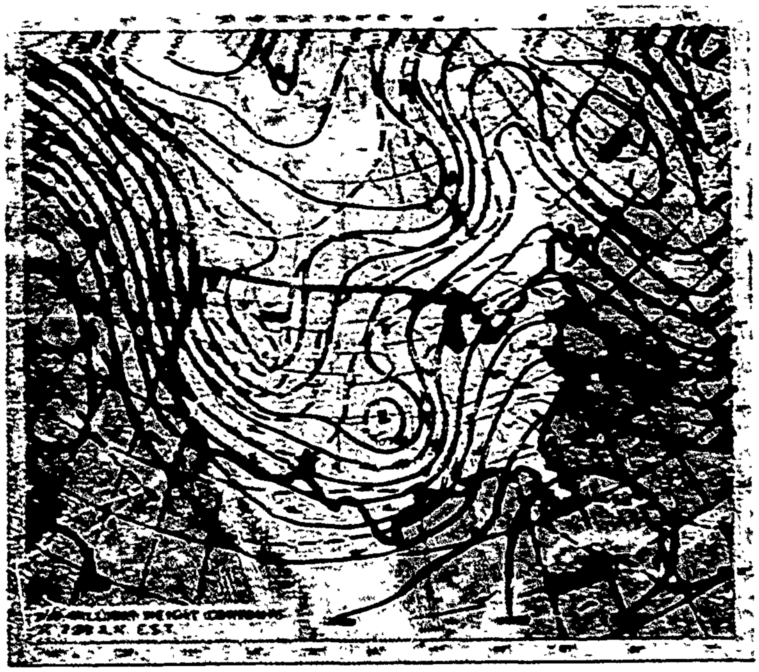


Figure 44b. 500-millibar height contours for 28 March 1977.

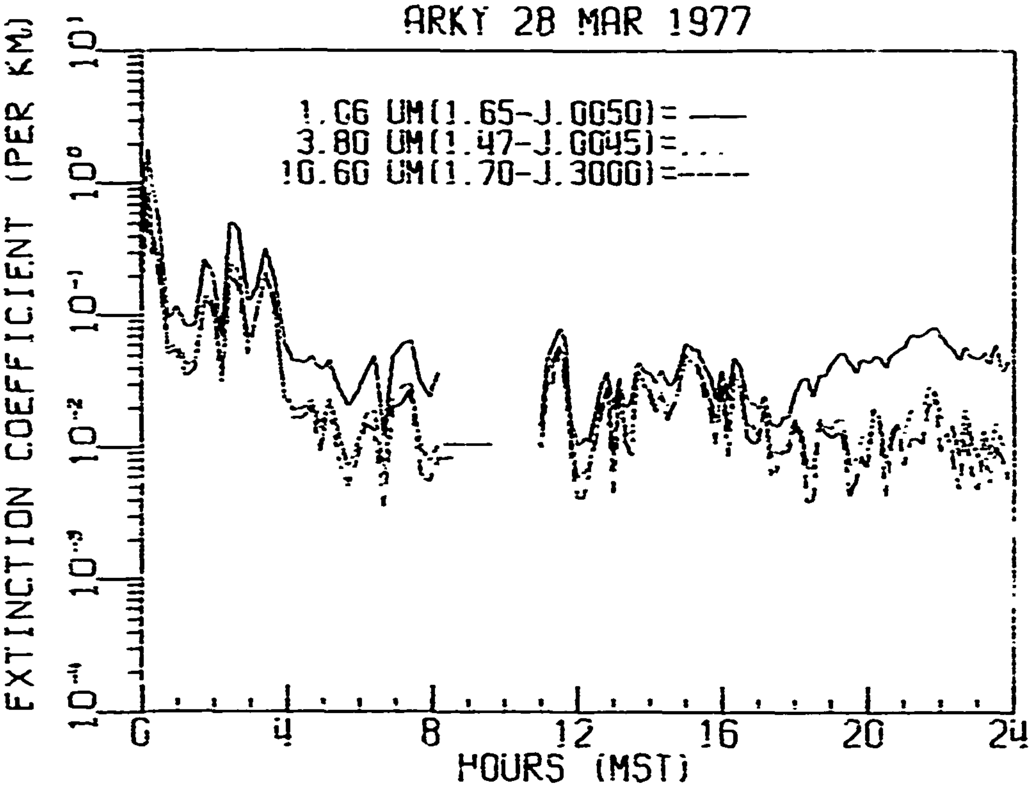


Figure 45. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 28 March 1977.

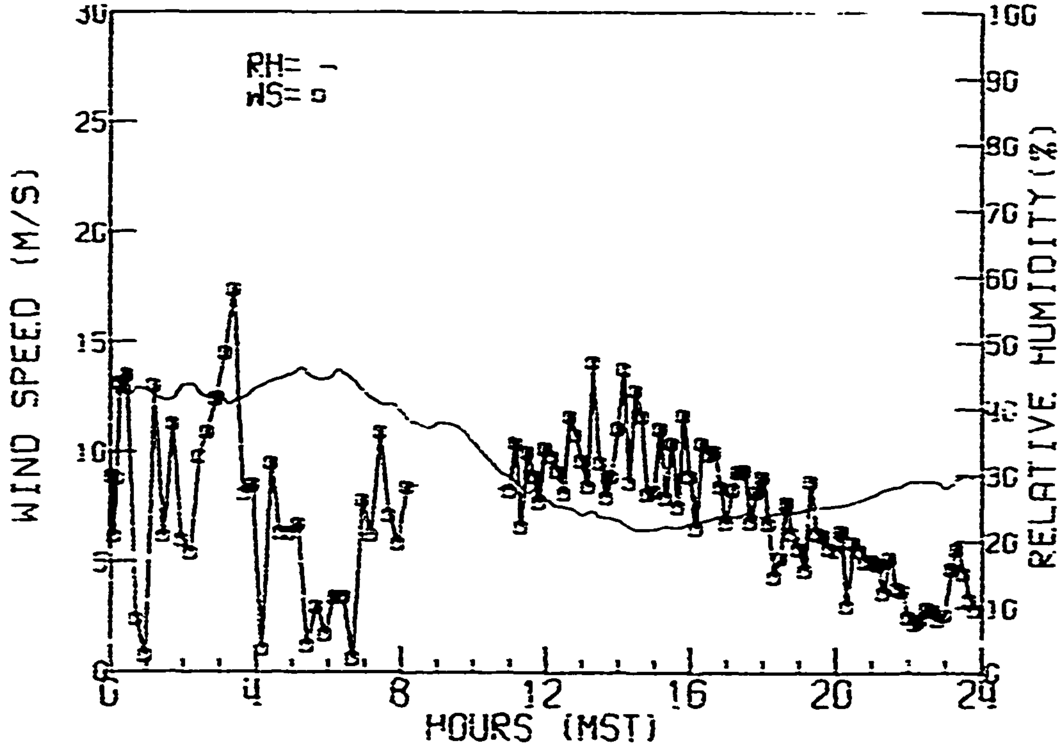


Figure 46. Diurnal variation of windspeed and relative humitdity, Arky Site, 28 March 1977.

TABLE 33
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
28 MAR 77														
	0 : 1:18	900	.66+02	.12+02	.42+01	.51+00	.51+00	.23+00	.00	.00	.45+00	.22+00	.17+00	1875.
	0 : 6:41	323	.19+03	.28+02	.93+01	.11+01	.19+01	.11+00	.00	.00	.11+01	.45+00	.34+00	3246.
	0 :10:16	215	.29+03	.48+02	.16+02	.22+01	.32+01	.55+00	.00	.00	.18+01	.87+00	.69+00	6929.
	0 :16:30	374	.16+03	.23+02	.84+01	.12+01	.14+01	.19+00	.00	.00	.99+00	.42+00	.33+00	3287.
	0 :27:53	903	.75+02	.11+02	.44+01	.57+00	.72+00	.27+00	.00	.00	.52+00	.25+00	.22+00	2455.
	0 :44:00	847	.12+02	.21+01	.73+00	.97-01	.24+00	.84-01	.00	.00	.97-01	.55-01	.52-01	565.
	0 :57:30	900	.15+02	.31+01	.13+01	.17+00	.22+00	.65-01	.00	.00	.12+00	.65-01	.55-01	573.
	01:14:00	900	.12+02	.19+01	.91+00	.91-01	.16+00	.39-01	.00	.00	.84-01	.43-01	.36-01	367.
	01:27:30	900	.12+02	.17+01	.95+00	.12+00	.13+00	.37-01	.00	.00	.86-01	.45-01	.39-01	387.
	01:44:00	900	.38+02	.53+01	.18+01	.26+00	.71+00	.17+00	.00	.00	.27+00	.14+00	.13+00	1339.
	01:57:30	900	.24+02	.38+01	.15+01	.36+00	.44+00	.17+00	.00	.00	.23+00	.12+00	.12+00	1236.
	02:14:00	900	.97+01	.16+01	.63+00	.91-01	.26+00	.13-01	.00	.00	.70-01	.35-01	.32-01	253.
	02:27:22	902	.75+02	.11+02	.37+01	.72+00	.64+00	.25+00	.00	.00	.51+00	.25+00	.21+00	2287.
	02:41:50	868	.70+02	.11+02	.80+01	.60+00	.50+00	.18+00	.00	.00	.46+00	.22+00	.17+00	1854.
	02:55:30	550	.23+02	.30+01	.92+00	.14+00	.24+00	.55-01	.00	.00	.13+00	.61-01	.52-01	583.
	03:11:00	900	.18+02	.23+01	.11+01	.31+00	.35+00	.20+00	.00	.00	.16+00	.11+00	.11+00	1217.
	03:26:30	900	.35+02	.50+01	.24+01	.65+00	.99+00	.35+00	.00	.00	.33+00	.22+00	.21+00	2239.
	03:41:00	900	.23+02	.29+01	.15+01	.39+00	.83+00	.79-01	.00	.00	.19+00	.11+00	.11+00	925.
	03:55:30	900	.11+02	.93+00	.25+00	.51-01	.15+00	.25-01	.00	.00	.63-01	.25-01	.25-01	254.
	04:11:00	900	.76+01	.96+00	.20+00	.61-01	.96-01	.13-01	.00	.00	.46-01	.20-01	.17-01	173.
	04:25:30	900	.73+01	.97+00	.26+00	.23-01	.00	.37-01	.00	.00	.44-01	.20-01	.17-01	237.
	04:41:00	900	.78+01	.72+00	.36+00	.61-01	.96-01	.26-01	.00	.00	.50-01	.23-01	.21-01	228.
	04:55:30	900	.72+01	.93+00	.29+00	.23-01	.00	.15-01	.00	.00	.39-01	.14-01	.77-02	131.
	05:11:00	900	.65+01	.67+00	.22+00	.10-01	.96-01	.52-01	.00	.00	.46-01	.24-01	.24-01	295.
	05:26:30	900	.49+01	.63+00	.32+00	.61-01	.00	.00	.00	.00	.28-01	.12-01	.50-02	82.
	05:41:00	900	.39+01	.51+00	.18+00	.10-01	.32-01	.00	.00	.00	.21-01	.73-02	.51-02	49.
	05:55:30	900	.44+01	.69+00	.41-01	.30-01	.00	.15-01	.00	.00	.26-01	.13-01	.50-02	119.
	06:11:00	900	.56+01	.84+00	.22+00	.10-01	.00	.39-01	.00	.00	.37-01	.18-01	.15-01	220.
	06:26:30	900	.87+01	.10+01	.53+00	.51-01	.64-01	.00	.00	.00	.53-01	.19-01	.14-01	125.
	06:41:00	900	.16+01	.66+00	.16+00	.20-01	.00	.00	.00	.00	.12-01	.64-02	.36-02	34.
	06:55:30	900	.69+01	.12+01	.41+00	.11+00	.00	.25-01	.00	.00	.18-01	.25-01	.20-01	240.
	07:11:00	900	.96+01	.15+01	.55+00	.11+00	.64-01	.13-01	.00	.00	.61-01	.29-01	.22-01	223.
	07:26:30	900	.13+02	.13+01	.43+00	.71-01	.15+00	.25-01	.00	.00	.66-01	.30-01	.27-01	272.
	07:41:00	900	.62+01	.64+00	.18+00	.40-01	.00	.00	.00	.00	.32-01	.99-02	.64-02	77.
	07:55:30	900	.45+01	.72+00	.15+00	.13-01	.32-01	.00	.00	.00	.25-01	.80-02	.55-02	55.
	08:11:00	900	.75+01	.67+00	.22+00	.10-01	.64-01	.00	.00	.00	.37-01	.11-01	.83-02	81.
	11:00:30	600	.96+00	.67+00	.21+00	.30-01	.95-01	.00	.00	.00	.15-01	.11-01	.74-02	55.
	11:10:00	600	.31+01	.19+01	.52+00	.91-01	.48-01	.59-01	.00	.00	.47-01	.36-01	.31-01	359.
	11:20:30	600	.45+01	.29+01	.11+01	.11+00	.48-01	.30-01	.00	.00	.63-01	.44-01	.31-01	323.
	11:30:00	600	.60+01	.25+01	.73+00	.15+00	.19+00	.98-01	.00	.00	.80-01	.61-01	.56-01	612.
	11:40:30	600	.64+01	.25+01	.91+00	.20+00	.95-01	.20-01	.00	.00	.65-01	.45-01	.34-01	305.

TABLE 33 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
28 MAR 77														
	11:50:00	600	.15+01	.56+00	.27+00	.61-01	.49-01	.00	.00	.00	.16-01	.12-01	.93-02	67.
	12:00:00	600	.14+01	.45+00	.30-01	.46-01	.00	.00	.00	.00	.11-01	.60-02	.43-02	41.
	12:10:00	600	.14+01	.60+00	.15+00	.33-01	.00	.00	.00	.00	.12-01	.57-02	.41-02	39.
	12:20:00	600	.12+01	.26+00	.93-01	.46-01	.48-01	.00	.00	.00	.11-01	.75-02	.68-02	48.
	12:30:00	600	.17+01	.56+00	.24+00	.15-01	.49-01	.20-01	.00	.00	.19-01	.13-01	.11-01	122.
	12:40:00	600	.29+01	.90+00	.27+00	.76-01	.96-01	.20-01	.00	.00	.31-01	.21-01	.19-01	178.
	12:50:00	600	.29+01	.77+00	.43+00	.46-01	.95-01	.57-01	.00	.00	.58-01	.29-01	.28-01	323.
	13:00:00	600	.29+01	.84+00	.36+00	.15-01	.00	.00	.00	.00	.19-01	.87-02	.46-02	46.
	13:10:00	600	.23+01	.92+00	.24+00	.11+00	.95-01	.37-01	.00	.00	.34-01	.28-01	.26-01	271.
	13:20:00	600	.21+01	.73+00	.12+00	.61-01	.96-01	.00	.00	.00	.20-01	.13-01	.11-01	78.
	13:30:00	600	.27+01	.10+01	.43+00	.30-01	.49-01	.00	.00	.00	.23-01	.13-01	.98-02	67.
	13:40:00	600	.24+01	.75+00	.36+00	.11+00	.24+00	.59-01	.00	.00	.44-01	.37-01	.39-01	378.
	13:50:00	600	.27+01	.69+00	.19+00	.91-01	.14+00	.57-01	.00	.00	.39-01	.31-01	.32-01	350.
	14:00:00	600	.28+01	.11+01	.33+00	.61-01	.96-01	.39-01	.00	.00	.35-01	.26-01	.24-01	254.
	14:10:00	600	.25+01	.12+01	.37+00	.33-01	.14+00	.20-01	.00	.00	.31-01	.21-01	.19-01	165.
	14:20:00	600	.35+01	.10+01	.46+00	.46-01	.14+00	.39-01	.00	.00	.39-01	.27-01	.26-01	259.
	14:30:00	600	.24+01	.10+01	.37+00	.76-01	.49-01	.20-01	.00	.00	.33-01	.21-01	.17-01	173.
	14:40:00	600	.30+01	.79+00	.37+00	.30-01	.19+00	.20-01	.00	.00	.32-01	.21-01	.21-01	172.
	14:50:00	600	.33+01	.11+01	.33+00	.91-01	.14+00	.37-01	.00	.00	.41-01	.33-01	.29-01	283.
	15:00:00	600	.34+01	.15+01	.46+00	.76-01	.19+00	.12+00	.00	.00	.62-01	.52-01	.52-01	614.
	15:10:00	600	.39+01	.15+01	.55+00	.91-01	.27+00	.57-01	.00	.00	.56-01	.43-01	.43-01	404.
	15:20:00	600	.38+01	.12+01	.73+00	.11+00	.14+00	.7[illegible]-01	.00	.00	.56-01	.45-01	.42-01	465.
	15:30:00	600	.33+01	.15+01	.52+00	.76-01	.96-01	.37-01	.00	.00	.42-01	.31-01	.26-01	274.
	15:40:00	600	.31+01	.15+01	.33+00	.61-01	.96-01	.20-01	.00	.00	.34-01	.23-01	.19-01	180.
	15:50:00	600	.26+01	.77+00	.47+00	.61-01	.49-01	.00	.00	.00	.24-01	.15-01	.11-01	61.
	16:00:00	600	.29+01	.94+00	.37+00	.11+00	.14+00	.39-01	.00	.00	.39-01	.31-01	.29-01	287.
	16:10:00	600	.29+01	.90+00	.47+00	.33-01	.49-01	.00	.00	.00	.23-01	.14-01	.91-02	67.
	16:20:00	600	.34+01	.12+01	.43+00	.61-01	.24+00	.59-01	.00	.00	.49-01	.37-01	.37-01	368.
	16:30:00	600	.34+01	.11+01	.43+00	.76-01	.14+00	.37-01	.00	.00	.41-01	.30-01	.29-01	277.
	16:40:00	600	.23+01	.79+00	.37+00	.15-01	.48-01	.20-01	.00	.00	.23-01	.15-01	.12-01	132.
	16:50:00	600	.22+01	.77+00	.33+00	.76-01	.49-01	.00	.00	.00	.22-01	.15-01	.11-01	84.
	17:00:00	600	.20+01	.73+00	.12+00	.61-01	.96-01	.00	.00	.00	.20-01	.13-01	.11-01	78.
	17:10:00	600	.15+01	.67+00	.19+00	.33-01	.00	.57-01	.00	.00	.25-01	.21-01	.20-01	280.
	17:20:00	600	.18+01	.58+00	.36+00	.15-01	.48-01	.00	.00	.00	.16-01	.89-02	.64-02	44.
	17:30:00	600	.14+01	.62+00	.24+00	.33-01	.49-01	.00	.00	.00	.15-01	.94-02	.71-02	49.
	17:40:00	600	.19+01	.51+00	.91-01	.00	.48-01	.20-01	.00	.00	.17-01	.98-02	.95-02	111.
	17:50:00	600	.21+01	.56+00	.12+00	.33-01	.00	.20-01	.00	.00	.18-01	.11-01	.93-02	121.
	18:00:00	600	.32+01	.28+00	.24+00	.76-01	.48-01	.20-01	.00	.00	.26-01	.17-01	.15-01	162.
	18:10:00	600	.57+01	.39+00	.21+00	.15-01	.49-01	.20-01	.00	.00	.33-01	.13-01	.12-01	196.
	18:20:00	600	.77+01	.49+00	.21+00	.00	.00	.00	.00	.00	.34-01	.72-02	.40-02	62.
	18:30:00	600	.52+01	.44+00	.19+00	.15-01	.00	.00	.00	.00	.25-01	.70-02	.42-02	54.

TABLE 33 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
28 MAR 77														
	18:40:00	600	.55+01	.62+00	.15+00	.00	.44-01	.31-01	.00	.00	.35-01	.17-01	.16-01	216.
	18:50:00	600	.61+01	.56+00	.12+00	.76-01	.96-01	.00	.00	.00	.36-01	.15-01	.13-01	111.
	19:00:00	600	.85+01	.56+00	.24+00	.00	.49-01	.20-01	.00	.00	.43-01	.18-01	.12-01	159.
	19:10:00	600	.10+02	.58+00	.21+00	.46-01	.00	.20-01	.00	.00	.51-01	.17-01	.13-01	185.
	19:20:00	600	.11+02	.73+00	.21+00	.30-01	.00	.20-01	.00	.00	.53-01	.16-01	.13-01	183.
	19:30:00	600	.10+02	.62+00	.91-01	.00	.00	.00	.00	.00	.45-01	.74-02	.44-02	79.
	19:40:00	600	.85+01	.39+00	.12+00	.30-01	.00	.00	.00	.00	.38-01	.85-02	.57-02	81.
	19:50:00	600	.99+01	.71+00	.15+00	.61-01	.00	.00	.00	.00	.47-01	.13-01	.88-02	112.
	20:00:00	600	.95+01	.71+00	.15+00	.00	.45-01	.00	.00	.00	.45-01	.97-02	.72-02	87.
	20:10:00	600	.83+01	.60+00	.91-01	.15-01	.96-01	.39-01	.00	.00	.49-01	.20-01	.20-01	252.
	20:20:00	600	.91+01	.50+00	.12+00	.46-01	.45-01	.20-01	.00	.00	.48-01	.17-01	.15-01	185.
	20:30:00	600	.93+01	.77+00	.12+00	.00	.00	.00	.00	.00	.41-01	.78-02	.44-02	75.
	20:40:00	600	.11+02	.79+00	.71-01	.30-01	.95-01	.00	.00	.00	.51-01	.14-01	.12-01	115.
	20:50:00	600	.11+02	.82+00	.61-01	.00	.96-01	.20-01	.00	.00	.55-01	.16-01	.15-01	183.
	21:00:00	600	.13+02	.97+00	.24+00	.15-01	.00	.00	.00	.00	.63-01	.13-01	.75-02	115.
	21:10:00	600	.15+02	.16+01	.40+00	.46-01	.00	.00	.00	.00	.72-01	.20-01	.12-01	154.
	21:20:00	600	.14+02	.15+01	.33+00	.61-01	.00	.00	.00	.00	.73-01	.19-01	.12-01	155.
	21:30:00	600	.15+02	.18+01	.37+00	.30-01	.00	.00	.00	.00	.73-01	.19-01	.11-01	149.
	21:40:00	600	.15+02	.17+01	.49+00	.91-01	.00	.20-01	.00	.00	.93-01	.29-01	.21-01	262.
	21:50:00	600	.15+02	.15+01	.58+00	.46-01	.29+00	.00	.00	.00	.84-01	.31-01	.28-01	210.
	22:00:00	600	.15+02	.17+01	.37+00	.15-01	.00	.00	.00	.00	.73-01	.17-01	.75-02	135.
	22:10:00	600	.12+02	.17+01	.18+00	.61-01	.48-01	.00	.00	.00	.61-01	.19-01	.13-01	186.
	22:20:00	600	.11+02	.13+01	.24+00	.30-01	.00	.00	.00	.00	.55-01	.14-01	.95-02	116.
	22:30:00	600	.11+02	.88+00	.12+00	.00	.00	.00	.00	.00	.47-01	.87-02	.49-02	84.
	22:40:00	600	.11+02	.11+01	.33+00	.46-01	.00	.20-01	.00	.00	.58-01	.20-01	.15-01	200.
	22:50:00	600	.11+02	.94+00	.24+00	.15-01	.00	.00	.00	.00	.50-01	.12-01	.67-02	97.
	23:00:00	600	.11+02	.71+00	.15+00	.00	.00	.00	.00	.00	.46-01	.85-02	.49-02	83.
	23:10:00	600	.11+02	.77+00	.61-01	.15-01	.00	.20-01	.00	.00	.53-01	.14-01	.11-01	174.
	23:20:00	600	.95+01	.90+00	.61-01	.15-01	.00	.00	.00	.00	.44-01	.89-02	.54-02	85.
	23:30:00	600	.13+02	.12+01	.15+00	.61-01	.00	.00	.00	.00	.61-01	.16-01	.10-01	139.
	23:40:00	600	.79+01	.67+00	.12+00	.30-01	.49-01	.00	.00	.00	.38-01	.11-01	.84-02	89.
	23:50:00	600	.96+01	.88+00	.21+00	.15-01	.00	.00	.00	.00	.45-01	.11-01	.61-02	89.

Weather Summary

Date: 29 March 1977

Synoptic

Surface: Low-pressure area over eastern south Dakota and weak low over central New Mexico.

500 Millibar: Closed low extending from southern Minnesota to northwestern Utah with strong southwesterly flow over New Mexico.

Holloman AFB

Clouds: Clear to few cumulus with bases at 1200 m AGL.

Wind: Generally westerly to southwesterly 10-15 m sec^{-1} with late morning gust to 19 m sec^{-1}.

Visibility: Generally 16-40 km in the morning decreasing to 3 km in blowing dust and blowing sand by midafternoon.

Maximum temperature:	16.7°C	Corresponding vapor pressure:	3.7 Torr
Minimum temperature:	5.6°C	Corresponding vapor pressure:	2.7 Torr

Figure 47a. Surface weather map for 29 March 1977.

Figure 47b. 500-millibar height contours for 29 March 1977.

TABLE 34

APACHE SITE RAWINSONDE DATA

DATE: 29 MAR 77 RELEASE NO.: 15 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.2	13.4	2.4	270.0	4.1
62.7	649.3	11.7	3.3	268.2	5.1
216.3	637.5	9.8	3.2	266.0	7.0
748.5	597.6	4.5	2.9	260.4	13.6
1108.4	571.6	1.0	2.7	259.9	19.2
1218.8	563.8	-.1	2.5	258.9	18.1
1785.9	525.0	-5.4	2.0	251.0	17.6
1892.0	517.9	-6.4	2.0	254.6	20.4
2006.3	510.6	-6.4	1.3	259.3	22.2
2120.1	503.1	-5.6	0.8	263.5	24.6
2259.6	494.2	-4.9	0.5	265.8	27.5
3221.5	436.6	-12.4	0.4	268.3	32.6

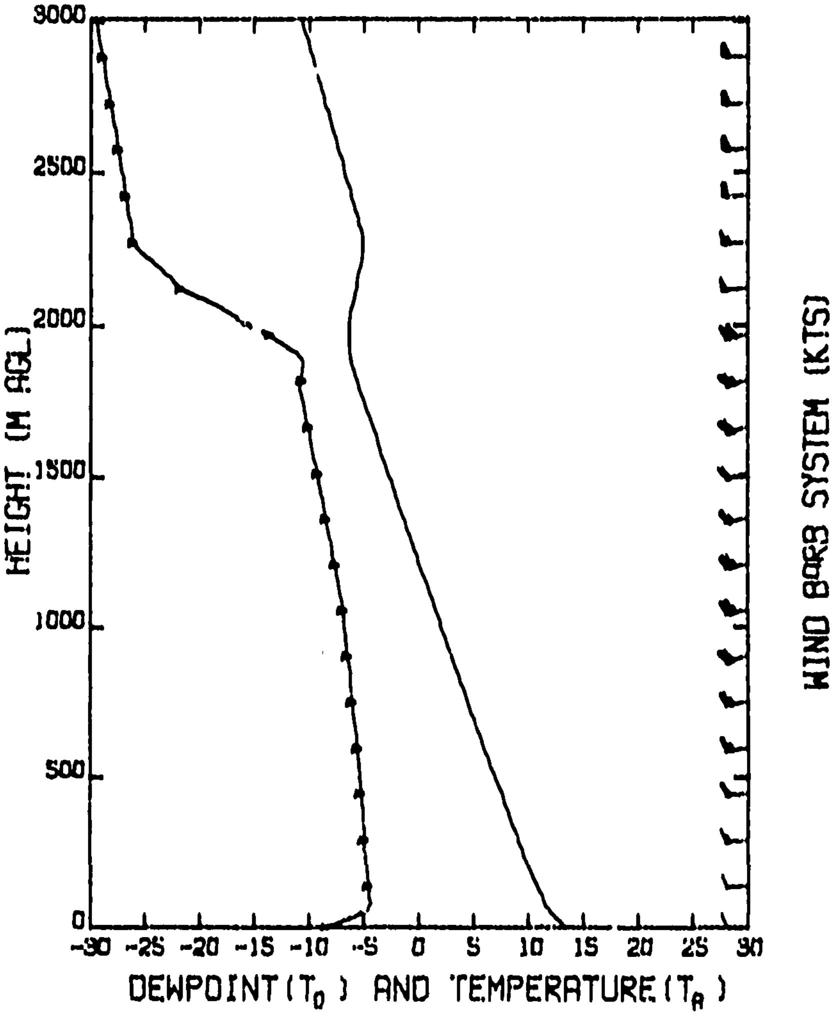


TABLE 35
APACHE SITE RAWINSONDE DATA

DATE: 29 MAR 77 RELEASE NO.: 16 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.2	13.1	2.8	270.0	9.3
229.6	637.5	11.6	2.8	275.2	10.5
1028.6	578.5	2.9	2.2	269.1	15.6
1808.3	525.0	-2.4	1.4	252.5	21.1
2575.6	476.1	-9.3	0.9	254.4	23.8
3050.4	447.6	-13.0	0.4	256.4	26.9

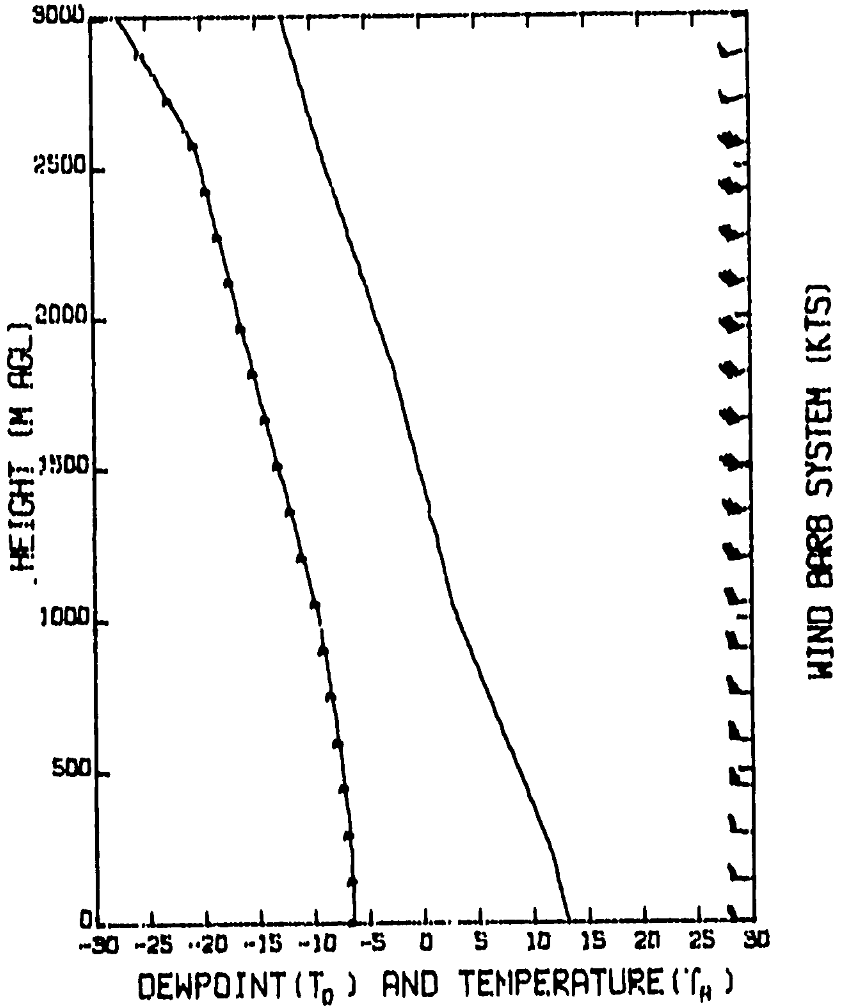
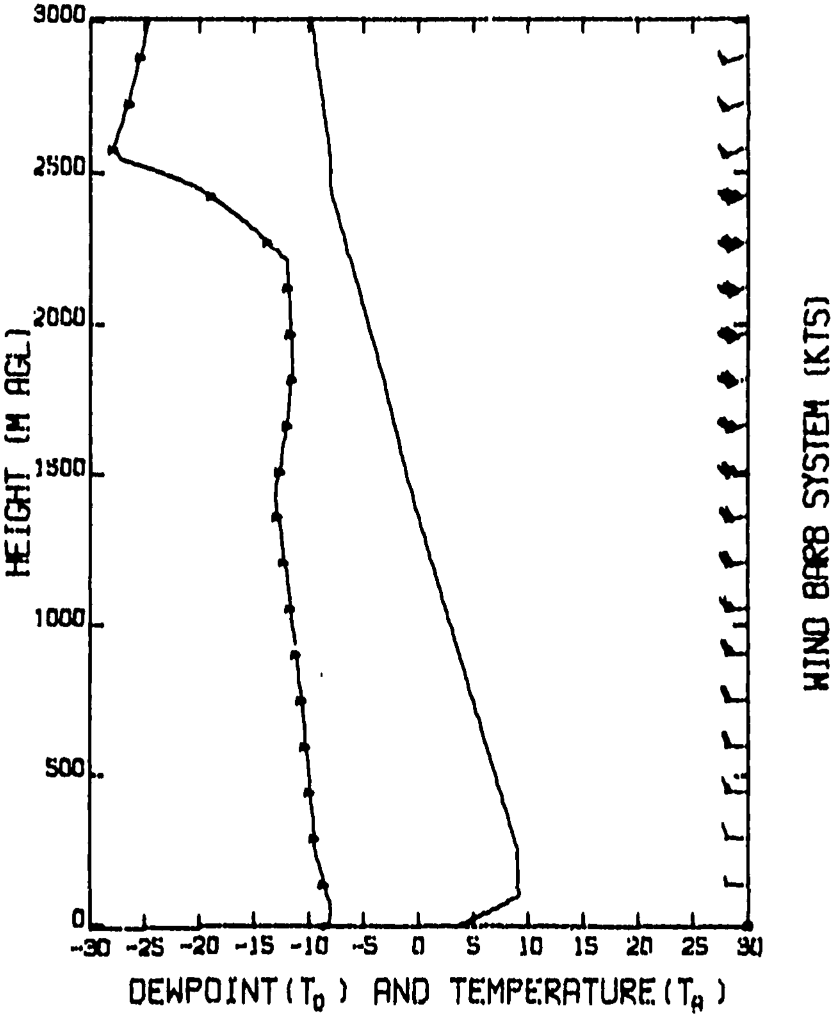


TABLE 36
APACHE SITE RAWINSONDE DATA

DATE: 29 MAR 77 RELEASE NO.: 17 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	657.5	3.4	2.4	0.0	0.0
97.0	649.8	9.2	2.4	272.3	1.6
255.3	637.5	9.0	2.2	272.3	4.0
1425.6	552.1	-.6	1.7	255.4	17.2
1827.2	525.0	-3.3	1.9	246.1	20.5
2217.3	49[illegible]	-6.3	1.8	241.5	22.1
2445.8	[illegible]	-8.1	0.9	245.6	24.0
2554.8	478.5	-8.1	0.4	247.6	24.8
3265.8	436.5	-10.9	0.7	246.8	31.4



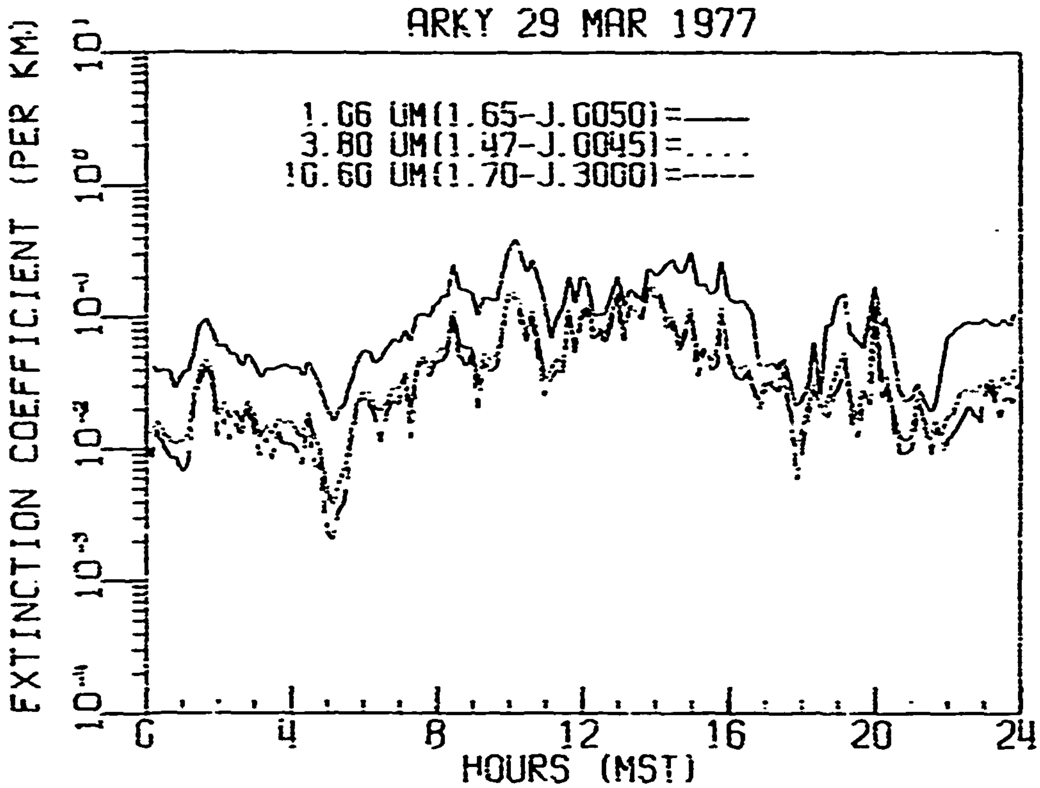


Figure 48. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 29 March 1977.

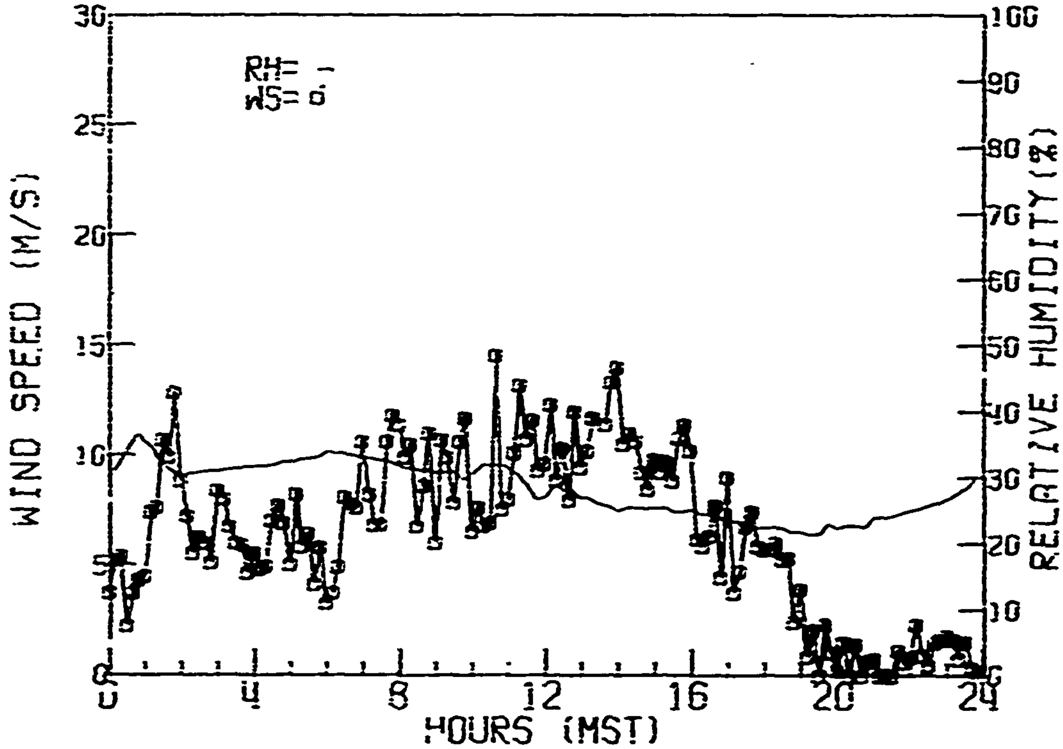


Figure 49. Diurnal variation of windspeed and relative humidity, Arky Site, 29 March 1977.

TABLE 37
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
29 MAR 77														
	0 : 0:00	600	.11+02	.86+00	.15+00	.61-01	.48-01	.00	.00	.00	.53-01	.15-01	.12-01	130.
	0 :10:00	600	.91+01	.12+01	.21+00	.15-01	.48-01	.00	.00	.00	.46-01	.13-01	.90-02	99.
	0 :20:00	600	.64+01	.92+00	.21+00	.30-01	.48-01	.20-01	.00	.00	.39-01	.17-01	.14-01	166.
	0 :30:00	600	.72+01	.94+00	.27+00	.15-01	.96-01	.00	.00	.00	.43-01	.16-01	.11-01	93.
	0 :40:00	600	.74+01	.82+00	.18+00	.30-01	.48-01	.00	.00	.00	.38-01	.12-01	.88-02	90.
	0 :50:00	600	.51+01	.58+00	.21+00	.00	.00	.20-01	.00	.00	.29-01	.11-01	.96-02	127.
	01:00:00	600	.74+01	.94+00	.27+00	.30-01	.00	.00	.00	.00	.38-01	.12-01	.69-02	85.
	01:10:00	600	.81+01	.77+00	.33+00	.46-01	.00	.00	.00	.00	.41-01	.13-01	.91-02	96.
	01:20:00	600	.87+01	.82+00	.30+00	.15+00	.96-01	.00	.00	.00	.53-01	.25-01	.21-01	179.
	01:30:00	600	.14+02	.16+01	.55+00	.76-01	.48-01	.59-01	.00	.00	.88-01	.39-01	.33-01	422.
	01:40:00	600	.19+02	.16+01	.55+00	.14+00	.48-01	.79-01	.00	.00	.98-01	.48-01	.42-01	500.
	01:50:00	600	.13+02	.15+01	.61+00	.14+00	.21+00	.20-01	.00	.00	.84-01	.40-01	.36-01	321.
	02:00:00	600	.12+02	.15+01	.24+00	.46-01	.48-01	.00	.00	.00	.61-01	.18-01	.12-01	139.
	02:10:00	600	.11+02	.92+00	.43+00	.76-01	.00	.20-01	.00	.00	.61-01	.23-01	.17-01	220.
	02:20:00	600	.10+02	.99+00	.40+00	.46-01	.48-01	.00	.00	.00	.54-01	.17-01	.12-01	126.
	02:30:00	600	.85+01	.11+01	.33+00	.76-01	.96-01	.00	.00	.00	.51-01	.20-01	.16-01	141.
	02:40:00	600	.78+01	.79+00	.33+00	.46-01	.96-01	.00	.00	.00	.43-01	.16-01	.13-01	113.
	02:50:00	600	.85+01	.11+01	.24+00	.30-01	.48-01	.39-01	.00	.00	.52-01	.23-01	.20-01	262.
	03:00:00	600	.78+01	.73+00	.21+00	.15-01	.00	.39-01	.00	.00	.45-01	.20-01	.16-01	236.
	03:10:00	600	.65+01	.75+00	.27+00	.30-01	.48-01	.00	.00	.00	.36-01	.12-01	.99-02	86.
	03:20:00	600	.73+01	.62+00	.21+00	.46-01	.00	.20-01	.00	.00	.40-01	.16-01	.12-01	168.
	03:30:00	600	.79+01	.82+00	.21+00	.61-01	.00	.00	.00	.00	.43-01	.13-01	.97-02	102.
	03:40:00	600	.73+01	.11+01	.33+00	.46-01	.96-01	.00	.00	.00	.44-01	.17-01	.14-01	114.
	03:50:00	600	.81+01	.13+01	.33+00	.46-01	.48-01	.00	.00	.00	.44-01	.16-01	.11-01	109.
	04:00:00	600	.73+01	.82+00	.33+00	.91-01	.00	.00	.00	.00	.41-01	.17-01	.13-01	110.
	04:10:00	600	.82+01	.71+00	.12+00	.71-01	.00	.00	.00	.00	.42-01	.14-01	.10-01	119.
	04:20:00	600	.71+01	.10+01	.21+00	.46-01	.00	.00	.00	.00	.37-01	.22-01	.77-02	91.
	04:30:00	600	.76+01	.94+00	.33+00	.61-01	.14+00	.00	.00	.00	.46-01	.19-01	.17-01	131.
	04:40:00	600	.67+01	.10+01	.24+00	.46-01	.00	.00	.00	.00	.36-01	.12-01	.77-02	89.
	04:50:00	600	.56+01	.56+00	.15+00	.30-01	.48-01	.00	.00	.00	.33-01	.98-02	.78-02	74.
	05:00:00	600	.40+01	.86+00	.30-01	.00	.00	.00	.00	.00	.21-01	.50-02	.26-02	39.
	05:10:00	600	.36+01	.30+00	.12+00	.00	.00	.00	.00	.00	.17-01	.39-02	.21-02	31.
	05:20:00	600	.39+01	.51+00	.91-01	.15-01	.00	.00	.00	.00	.20-01	.56-02	.34-02	43.
	05:30:00	600	.45+01	.60+00	.14+00	.15-01	.00	.00	.00	.00	.23-01	.71-02	.41-02	50.
	05:40:00	600	.59+01	.56+00	.18+00	.30-01	.00	.20-01	.00	.00	.33-01	.13-01	.11-01	148.
	05:50:00	600	.71+01	.10+01	.33+00	.46-01	.96-01	.20-01	.00	.00	.46-01	.21-01	.18-01	192.
	06:00:00	600	.83+01	.11+01	.24+00	.61-01	.96-01	.39-01	.00	.00	.56-01	.27-01	.25-01	288.
	06:10:00	600	.80+01	.11+01	.45+00	.61-01	.48-01	.39-01	.00	.00	.54-01	.27-01	.23-01	281.
	06:20:00	600	.71+01	.90+00	.36+00	.46-01	.96-01	.20-01	.00	.00	.45-01	.21-01	.18-01	190.
	06:30:00	600	.93+01	.12+01	.69+00	.61-01	.00	.00	.00	.00	.53-01	.20-01	.12-01	124.
	06:40:00	600	.11+02	.11+01	.43+00	.30-01	.96-01	.20-01	.00	.00	.60-01	.23-01	.19-01	209.

TABLE 37 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
29 MAR 77														
	06:50:00	600	.11+02	.15+01	.58+00	.30-01	.48-01	.39-01	.00	.00	.67-01	.29-01	.23-01	291.
	07:00:00	600	.11+02	.14+01	.43+00	.14+00	.00	.23-01	.00	.00	.66-01	.29-01	.22-01	257.
	07:10:00	600	.12+02	.14+01	.40+00	.91-01	.24+00	.39-01	.00	.00	.80-01	.38-01	.37-01	364.
	07:20:00	600	.13+02	.14+01	.45+00	.61-01	.00	.00	.00	.00	.67-01	.20-01	.12-01	151.
	07:30:00	600	.17+02	.15+01	.61+00	.91-01	.14+00	.59-01	.00	.00	.10+00	.45-01	.40-01	466.
	07:40:00	600	.17+02	.17+01	.55+00	.14+00	.24+00	.57-01	.00	.00	.11+00	.51-01	.48-01	510.
	07:50:00	600	.17+02	.18+01	.46+00	.11+00	.14+00	.39-01	.00	.00	.99-01	.41-01	.35-01	394.
	08:00:00	600	.21+02	.23+01	.67+00	.14+00	.49-01	.77-01	.00	.00	.13+00	.55-01	.45-01	591.
	08:10:00	600	.25+02	.27+01	.85+00	.14+00	.14+00	.59-01	.00	.00	.14+00	.58-01	.48-01	563.
	08:20:00	600	.25+02	.27+01	.92+00	.15+00	.34+00	.37-01	.00	.00	.15+00	.51-01	.44-01	530.
	08:30:00	600	.42+02	.43+01	.17+01	.33+00	.29+00	.12+00	.00	.00	.26+00	.11+00	.96-01	1100.
	08:40:00	600	.29+02	.34+01	.97+00	.20+00	.27+00	.23-01	.00	.00	.16+00	.54-01	.52-01	503.
	08:50:00	600	.29+02	.33+01	.10+01	.15+00	.96-01	.39-01	.00	.00	.16+00	.50-01	.44-01	521.
	09:00:00	600	.26+02	.29+01	.73+00	.76-01	.27+00	.57-01	.00	.00	.15+00	.58-01	.51-01	565.
	09:10:00	600	.21+02	.19+01	.70+00	.91-01	.48-01	.00	.00	.00	.11+00	.32-01	.21-01	242.
	09:20:00	600	.25+02	.28+01	.59+00	.12+00	.11+00	.57-01	.00	.00	.14+00	.54-01	.46-01	552.
	09:30:00	600	.26+02	.22+01	.70+00	.76-01	.19+00	.39-01	.00	.00	.14+00	.47-01	.40-01	454.
	09:40:00	600	.23+02	.29+01	.73+00	.11+00	.95-01	.57-01	.00	.00	.13+00	.52-01	.42-01	522.
	09:50:00	600	.34+02	.36+01	.10+01	.11+00	.29+00	.98-01	.00	.00	.20+00	.79-01	.69-01	814.
	10:00:00	600	.50+02	.44+01	.17+01	.38+00	.43+00	.22+00	.00	.00	.32+00	.15+00	.14+00	1619.
	10:10:00	600	.67+02	.61+01	.17+01	.38+00	.63+00	.24+00	.00	.00	.39+00	.16+00	.14+00	1745.
	10:20:00	600	.59+02	.60+01	.17+01	.24+00	.27+00	.11+00	.00	.00	.35+00	.12+00	.10+00	1254.
	10:30:00	600	.42+02	.39+01	.11+01	.20+00	.43+00	.20-01	.00	.00	.23+00	.77-01	.65-01	678.
	10:40:00	600	.45+02	.42+01	.14+01	.71-01	.43+00	.11+00	.00	.00	.27+00	.11+00	.10+00	1241.
	10:50:00	600	.37+02	.32+01	.88+00	.12+00	.48-01	.79-01	.00	.00	.19+00	.65-01	.51-01	703.
	11:00:00	600	.26+02	.21+01	.45+00	.76-01	.11+00	.00	.00	.00	.13+00	.34-01	.26-01	282.
	11:10:00	600	.84+01	.19+01	.58+00	.91-01	.96-01	.59-01	.00	.00	.69-01	.41-01	.35-01	404.
	11:20:00	600	.15+02	.15+01	.13+01	.21+00	.11+00	.23-01	.00	.00	.97-01	.48-01	.39-01	370.
	11:30:00	600	.22+02	.18+01	.49+00	.14+00	.14+00	.39-01	.00	.00	.12+00	.45-01	.39-01	442.
	11:40:00	600	.29+02	.35+01	.15+01	.29+00	.24+00	.23+00	.00	.00	.21+00	.12+00	.11+00	1275.
	11:50:00	600	.21+02	.20+01	.61+00	.91-01	.19+00	.98-01	.00	.00	.13+00	.59-01	.54-01	666.
	12:00:00	600	.33+02	.34+01	.12+01	.33+00	.48+00	.93-01	.00	.00	.23+00	.10+00	.74-01	949.
	12:10:00	600	.17+02	.38+01	.16+01	.32+00	.48+00	.20+00	.00	.00	.18+00	.13+00	.12+00	1271.
	12:20:00	600	.87+01	.31+01	.13+01	.24+00	.21+00	.93-01	.00	.00	.11+00	.79-01	.59-01	711.
	12:30:00	600	.68+01	.26+01	.88+00	.18+00	.14+00	.18+00	.00	.00	.10+00	.82-01	.77-01	951.
	12:40:00	600	.13+02	.35+01	.11+01	.14+00	.24+00	.12+00	.00	.00	.11+00	.75-01	.57-01	742.
	12:50:00	600	.14+02	.45+01	.16+01	.43+00	.34+00	.79-01	.00	.00	.15+00	.10+00	.86-01	835.
	13:00:00	600	.17+02	.51+01	.17+01	.39+00	.49+00	.21+00	.00	.00	.21+00	.16+00	.15+00	1653.
	13:10:00	600	.12+02	.4 +01	.13+01	.20+00	.24+00	.98-01	.00	.00	.12+00	.81-01	.68-01	724.
	13:20:00	600	.13+02	.59+01	.15+01	.27+00	.27+00	.25+00	.00	.00	.14+00	.12+00	.12+00	1399.
	13:40:00	600	.10+02	.34+01	.12+01	.30+00	.43+00	.14+00	.00	.00	.13+00	.10+00	.94-01	953.

TABLE 37 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE	TIME (PST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
29 MAR 77														
	13:50:00	600	.17+02	.62+01	.26+01	.41+00	.13+01	.18+00	.00	.00	.23+00	.17+00	.17+00	2443.
	14:00:00	500	.15+02	.61+01	.23+01	.53+00	.53+00	.20+00	.00	.00	.21+00	.15+00	.14+00	1445.
	14:10:00	600	.24+02	.50+01	.17+01	.27+00	.38+00	.28+00	.00	.00	.22+00	.14+00	.13+00	1614.
	14:20:00	500	.45+02	.37+01	.13+01	.24+00	.34+00	.93-01	.00	.00	.25+00	.99-01	.95-01	975.
	14:30:00	600	.51+02	.38+01	.97+00	.14+00	.53+00	.12+00	.00	.00	.28+00	.10+00	.94-01	1067.
	14:40:00	500	.43+02	.30+01	.35+00	.18+00	.13+00	.57-01	.00	.00	.22+00	.73-01	.57-01	713.
	14:50:00	600	.43+02	.32+01	.11+01	.76-01	.48+00	.59-01	.00	.00	.23+00	.76-01	.69-01	729.
	15:00:00	500	.55+02	.48+01	.12+01	.33+00	.43+00	.12+00	.00	.00	.31+00	.12+00	.11+00	1290.
	15:10:00	600	.36+02	.30+01	.64+00	.11+00	.96-01	.20-01	.00	.00	.17+00	.48-01	.35-01	448.
	15:20:00	500	.34+02	.21+01	.51+00	.11+00	.43+00	.30-01	.00	.00	.18+00	.57-01	.56-01	567.
	15:30:00	600	.29+02	.21+01	.76+00	.30-01	.14+00	.59-01	.00	.00	.15+00	.49-01	.41-01	523.
	15:40:00	500	.30+02	.18+01	.82+00	.61-01	.17+00	.57-01	.00	.00	.16+00	.53-01	.46-01	557.
	15:50:00	600	.42+02	.53+01	.16+01	.20+00	.19+00	.20+00	.00	.00	.27+00	.12+00	.10+00	1334.
	16:00:00	500	.25+02	.21+01	.55+00	.76-01	.95-01	.70-01	.00	.00	.14+00	.51-01	.44-01	594.
	16:10:00	600	.25+02	.15+01	.58+00	.76-01	.14+00	.39-01	.00	.00	.13+00	.42-01	.36-01	429.
	16:20:00	500	.27+02	.16+01	.33+00	.91-01	.00	.57-01	.00	.00	.14+00	.41-01	.34-01	502.
	16:30:00	600	.24+02	.14+01	.40+00	.17+00	.96-01	.39-01	.00	.00	.12+00	.44-01	.38-01	457.
	16:40:00	500	.21+02	.16+01	.43+00	.61-01	.24+00	.00	.00	.00	.10+00	.31-01	.27-01	245.
	16:50:00	600	.59+01	.12+01	.43+00	.61-01	.96-01	.20-01	.00	.00	.44-01	.24-01	.20-01	196.
	17:00:00	500	.32+01	.11+01	.37+00	.91-01	.19+00	.30-01	.00	.00	.32-01	.32-01	.31-01	292.
	17:10:00	600	.35+01	.14+01	.58+00	.15-01	.14+00	.59-01	.00	.00	.45-01	.33-01	.30-01	332.
	17:20:00	500	.33+01	.14+01	.53+00	.61-01	.14+00	.30-01	.00	.00	.41-01	.31-01	.29-01	273.
	17:30:00	600	.32+01	.14+01	.24+00	.61-01	.19+00	.79-01	.00	.00	.50-01	.38-01	.39-01	436.
	17:40:00	500	.34+01	.11+01	.37+00	.46-01	.95-01	.20-01	.00	.00	.32-01	.20-01	.13-01	167.
	17:50:00	600	.30+01	.11+01	.30+00	.30-01	.00	.00	.00	.00	.22-01	.11-01	.59-02	58.
	18:00:00	500	.29+01	.97+00	.13+00	.46-01	.95-01	.00	.00	.00	.29-01	.13-01	.11-01	77.
	18:10:00	600	.26+01	.11+01	.41+00	.76-01	.19+00	.00	.00	.00	.31-01	.21-01	.20-01	119.
	18:20:00	500	.99+01	.11+01	.61+00	.51-01	.95-01	.30-01	.00	.00	.65-01	.32-01	.27-01	307.
	18:30:00	600	.12+01	.10+01	.30+00	.15-01	.96-01	.39-01	.00	.00	.26-01	.21-01	.20-01	216.
	18:40:00	500	.19+02	.11+01	.24+00	.51-01	.95-01	.00	.00	.00	.84-01	.22-01	.17-01	190.
	18:50:00	600	.18+02	.10+01	.37+00	.41-01	.48-01	.30-01	.00	.00	.91-01	.30-01	.26-01	343.
	19:00:00	500	.27+02	.22+01	.73+00	.14+00	.00	.20-01	.00	.00	.14+00	.42-01	.30-01	392.
	19:10:00	600	.28+02	.25+01	.82+00	.91-01	.29+00	.39-01	.00	.00	.15+00	.55-01	.48-01	503.
	19:20:00	500	.15+02	.11+01	.45+00	.12+00	.00	.00	.00	.00	.77-01	.25-01	.17-01	195.
	19:30:00	600	.14+02	.82+00	.30+00	.46-01	.48-01	.00	.00	.00	.66-01	.17-01	.12-01	145.
	19:40:00	500	.90+01	.99+00	.12+00	.30-01	.95-01	.57-01	.00	.00	.59-01	.28-01	.29-01	352.
	19:50:00	600	.16+02	.15+01	.49+00	.76-01	.48-01	.20-01	.00	.00	.86-01	.29-01	.22-01	270.
	20:00:00	500	.17+02	.27+01	.15+01	.33+00	.43+00	.22+00	.00	.00	.17+00	.12+00	.12+00	1327.
	20:10:00	600	.16+02	.17+01	.52+00	.46-01	.48-01	.39-01	.00	.00	.88-01	.32-01	.26-01	334.
	20:20:00	500	.17+02	.14+01	.47+00	.19+00	.14+00	.00	.00	.00	.10+00	.37-01	.30-01	293.
	20:30:00	600	.12+02	.67+00	.33+00	.11+00	.48-01	.00	.00	.00	.60-01	.21-01	.16-01	164.

TABLE 37 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.5	MASS LOADING (UG/M**3)
29 MAR 77													
20:40:00	600	.49+01	.47+00	.24+00	.91-01	.00	.00	.00	.00	.29-01	.13-01	.95-02	95.
20:50:00	500	.35+01	.54+00	.15+00	.51-01	.43-01	.00	.00	.00	.24-01	.12-01	.78-02	79.
21:00:00	600	.32+01	.77+00	.24+00	.30-01	.96-01	.00	.00	.00	.24-01	.12-01	.10-01	72.
21:10:00	500	.29+01	.54+00	.33+00	.91-01	.43-01	.39-01	.00	.00	.32-01	.25-01	.22-01	254.
21:20:00	600	.24+01	.56+00	.27+00	.61-01	.48-01	.29-01	.00	.00	.24-01	.17-01	.15-01	153.
21:30:00	500	.21+01	.73+00	.37+00	.15-01	.95-01	.00	.00	.00	.20-01	.12-01	.75-02	58.
21:40:00	600	.20+01	.59+00	.15+00	.76-01	.48-01	.20-01	.00	.00	.22-01	.16-01	.15-01	156.
21:50:00	500	.77+01	.59+00	.91-01	.51-01	.43-01	.00	.00	.00	.30-01	.13-01	.10-01	105.
22:00:00	600	.15+02	.33+01	.30+00	.30-01	.48-01	.00	.00	.00	.70-01	.18-01	.12-01	148.
22:10:00	500	.17+02	.11+01	.12+00	.30-01	.00	.29-01	.00	.00	.79-01	.19-01	.14-01	227.
22:20:00	600	.17+02	.19+01	.46+00	.11+00	.00	.00	.00	.00	.87-01	.27-01	.17-01	278.
22:30:00	500	.13+02	.14+01	.51+00	.45-01	.43-01	.20-01	.00	.00	.93-01	.29-01	.21-01	269.
22:40:00	600	.18+02	.19+01	.67+00	.61-01	.48-01	.00	.00	.00	.91-01	.28-01	.18-01	203.
22:50:00	500	.13+02	.19+01	.70+00	.76-01	.00	.00	.00	.00	.99-01	.27-01	.16-01	199.
23:00:00	600	.16+02	.22+01	.40+00	.61-01	.48-01	.59-01	.00	.00	.97-01	.39-01	.32-01	431.
23:10:00	500	.15+02	.20+01	.73+00	.11+00	.43-01	.20-01	.00	.00	.91-01	.35-01	.26-01	298.
23:20:00	600	.17+02	.21+01	.58+00	.30-01	.96-01	.00	.00	.00	.86-01	.26-01	.18-01	186.
23:30:00	500	.13+02	.23+01	.67+00	.91-01	.43-01	.20-01	.00	.00	.98-01	.35-01	.25-01	302.
23:40:00	600	.16+02	.19+01	.64+00	.30-01	.96-01	.20-01	.00	.00	.88-01	.31-01	.23-01	262.
23:50:00	500	.19+02	.19+01	.57+00	.14+00	.00	.39-01	.00	.00	.10+00	.41-01	.31-01	401.

Weather Summary

Date: 30 March 1977

Synoptic

Surface: Rapidly filling surface low-pressure area over eastern South Dakota. Weak surface pressure gradient over New Mexico.

500 Millibar: Closed low pressure centers over eastern South Dakota and north-central California with interconnecting trough resulting in strong southwesterly flow over New Mexico.

Holloman AFB

Clouds: Mostly clear to scattered (less than 0.3) high clouds (cirrus).

Wind: Light and variable with a peak gust of 7 m sec^{-1} out of the south.

Visibility: Generally greater than 60 km.

Maximum temperature:	21.1°C	Corresponding vapor pressure:	2.8 Torr
Minimum temperature:	1.7°C	Corresponding vapor pressure:	2.5 Torr

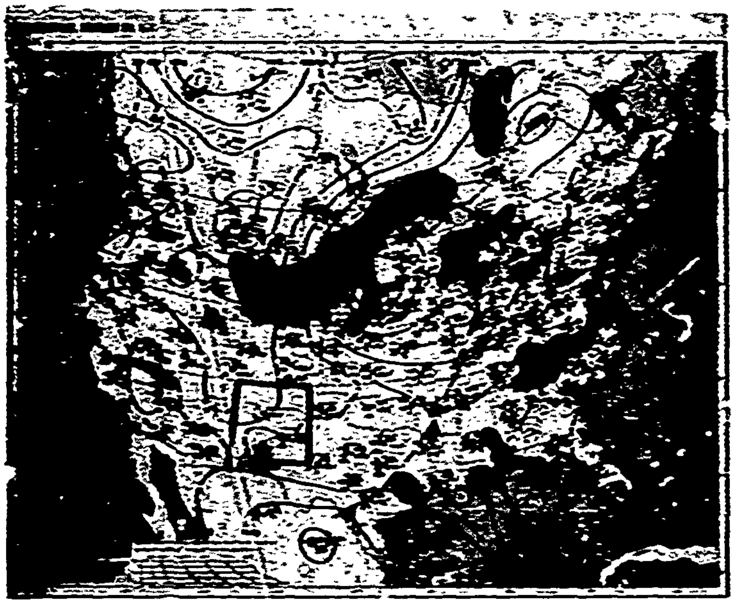


Figure 50a. Surface weather map for 30 March 1977.

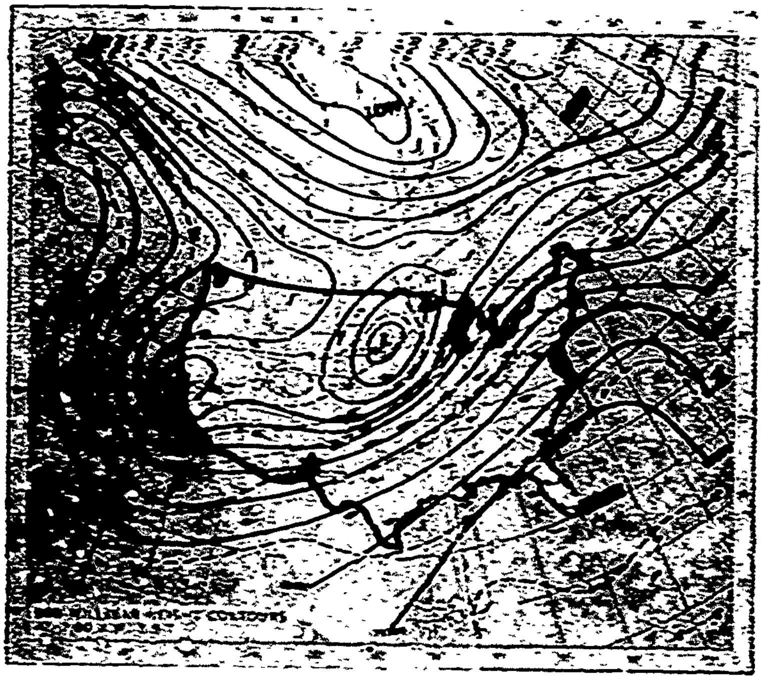


Figure 50b. 500-millibar height contours for 30 March 1977.

TABLE 38. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 30 March 1977 Remarks
0100							
0200							
0300							
0400							
0500							
0600							
0700							
0800							
0900							
1000							
1100							
1200	16.9	3.1	-4.3	0	0	40 Cs	Plane observed
1300	17.5	3.1	-4.1	0 Cu	0	40 Cs	Single puff Cu W
1400	19.6	3.4	-3.2	0	0	10 Cs	
1500	19.9	3.3	-3.6	0	0	0 Cs	Few Cs N
1600	19.8	2.9	-5.1	0	0	0 Cs	Few Cs N
1700	19.4	2.8	-5.5	0	0	0	
1800	18.0	2.7	-5.9	0	0	0	Apache ok
1900	15.2	2.8	-6.0	0	0	0 Cs	Few Cs W-NW
2000	9.3	2.9	-5.6	0	0	3 Ci	
2100	6.5	3.7	-2.5	0	0	3 Ci	
2200	7.5	3.4	-3.5	0	0	6 Ci	
2300	8.3	3.3	-3.9	0	0	2 Ci	
2400	9.5	4.1	-1.2	0	0	0	Plane observed

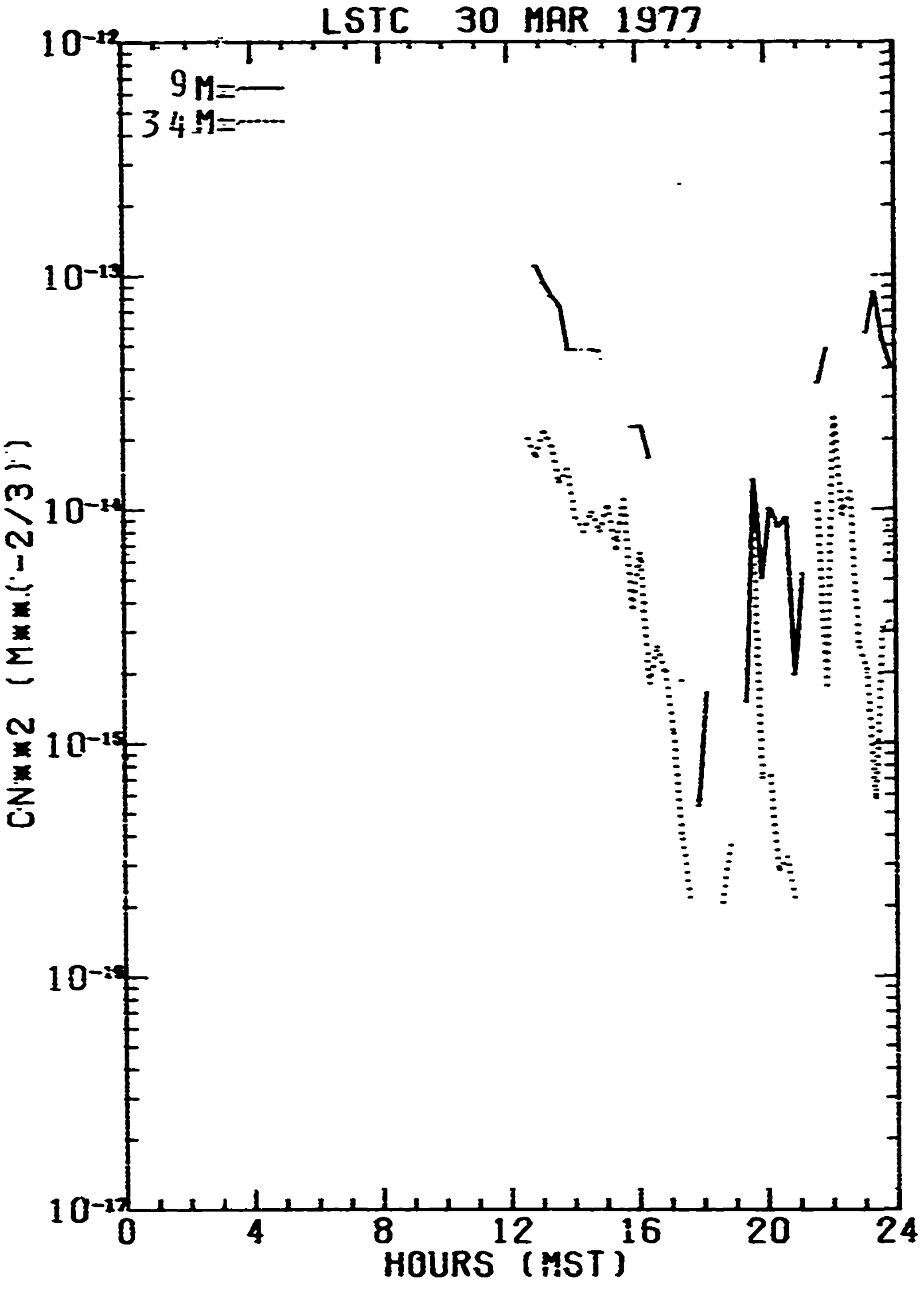


Figure 51. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 30 March 1977.

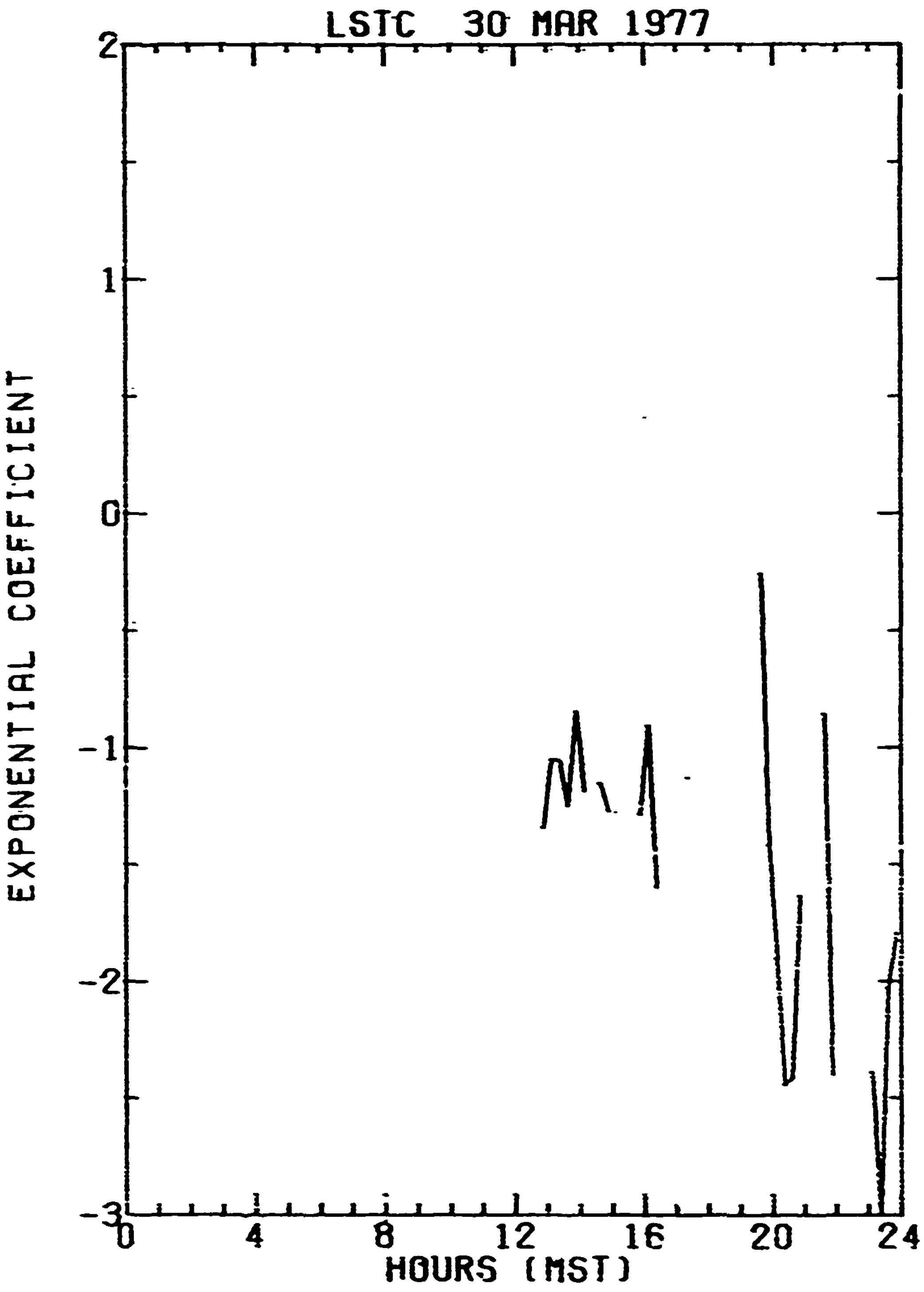


Figure 52. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 30 March 1977.

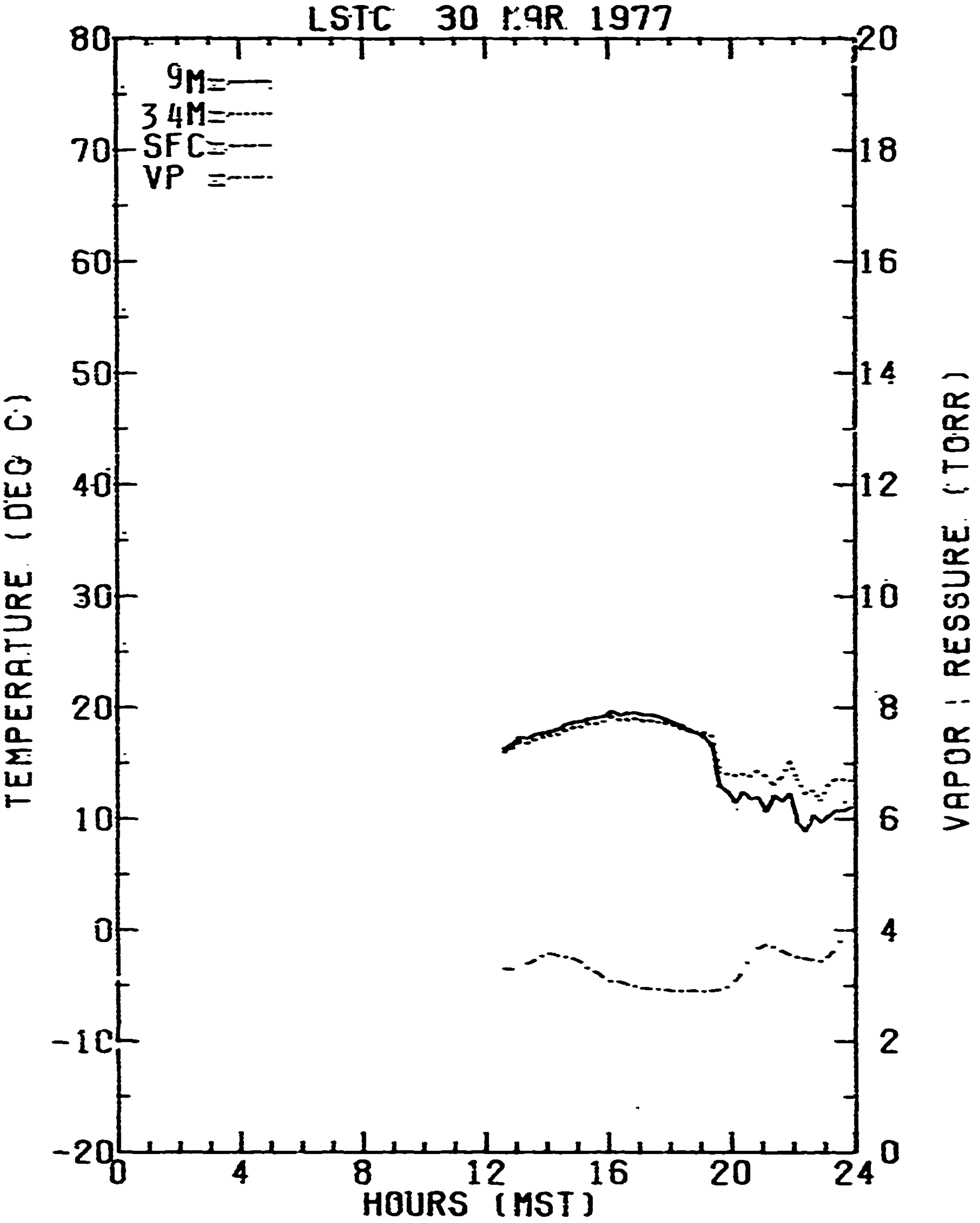


Figure 53. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 30 March 1977.

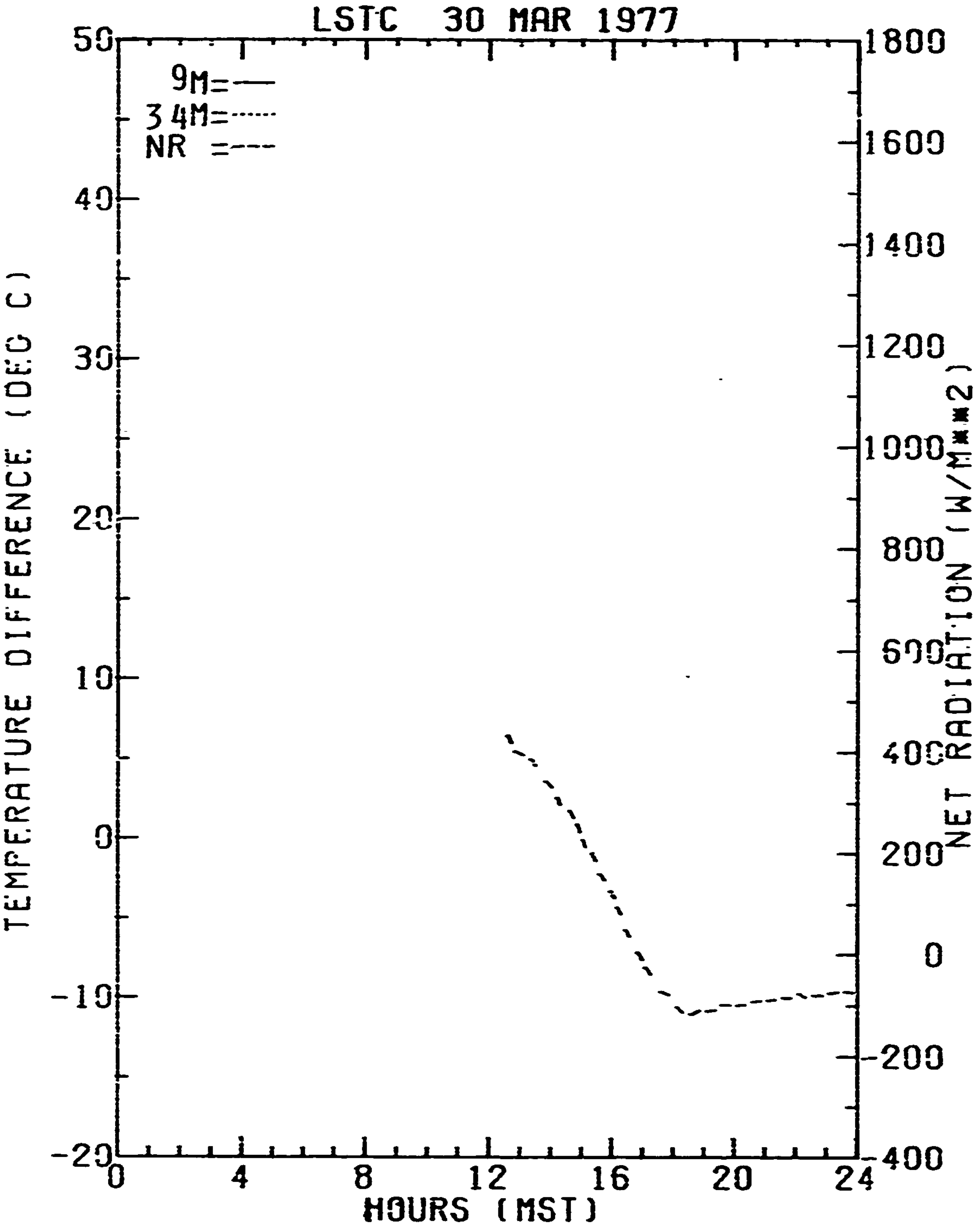


Figure 54. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 30 March 1977.

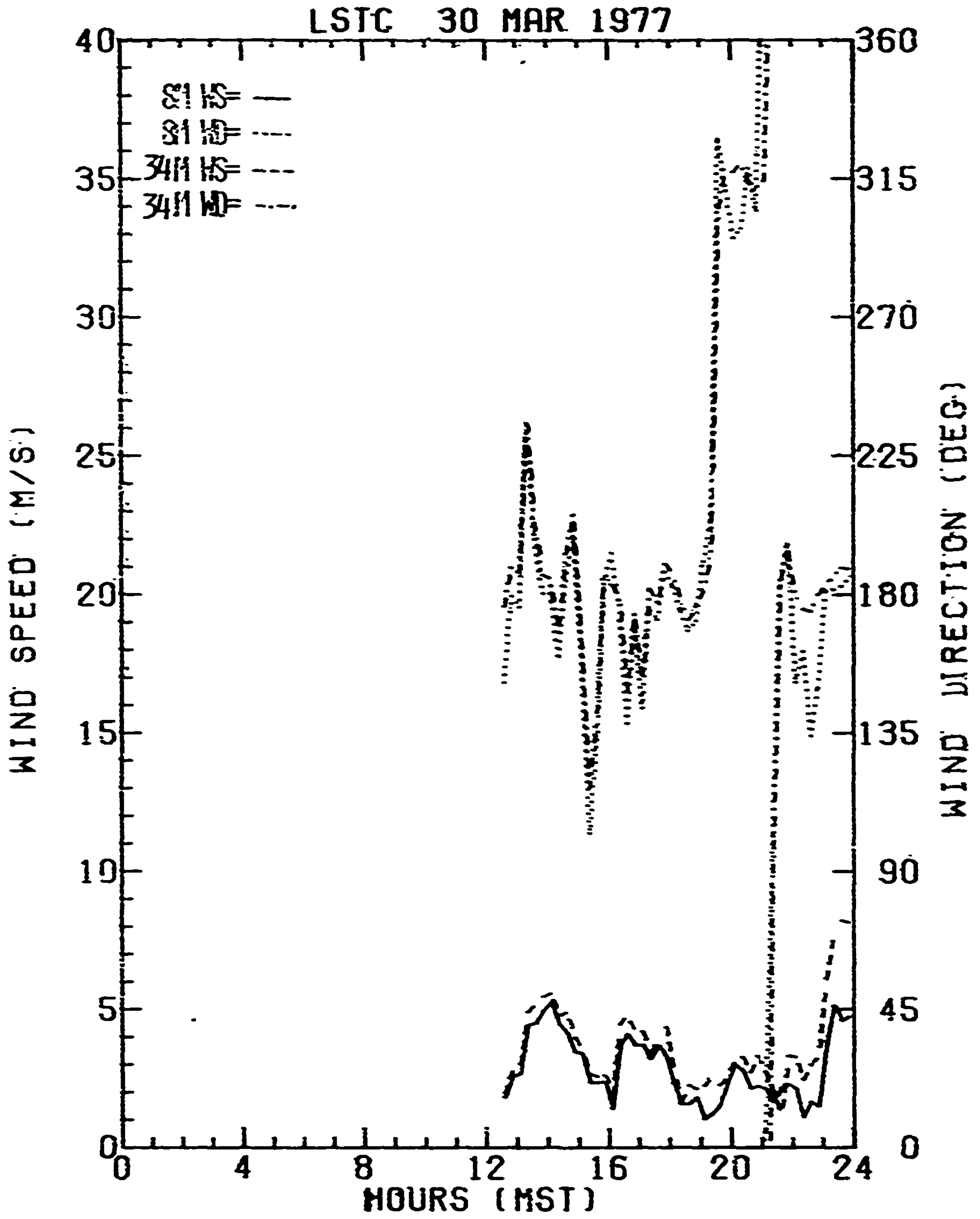


Figure 55. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 30 March 1977.

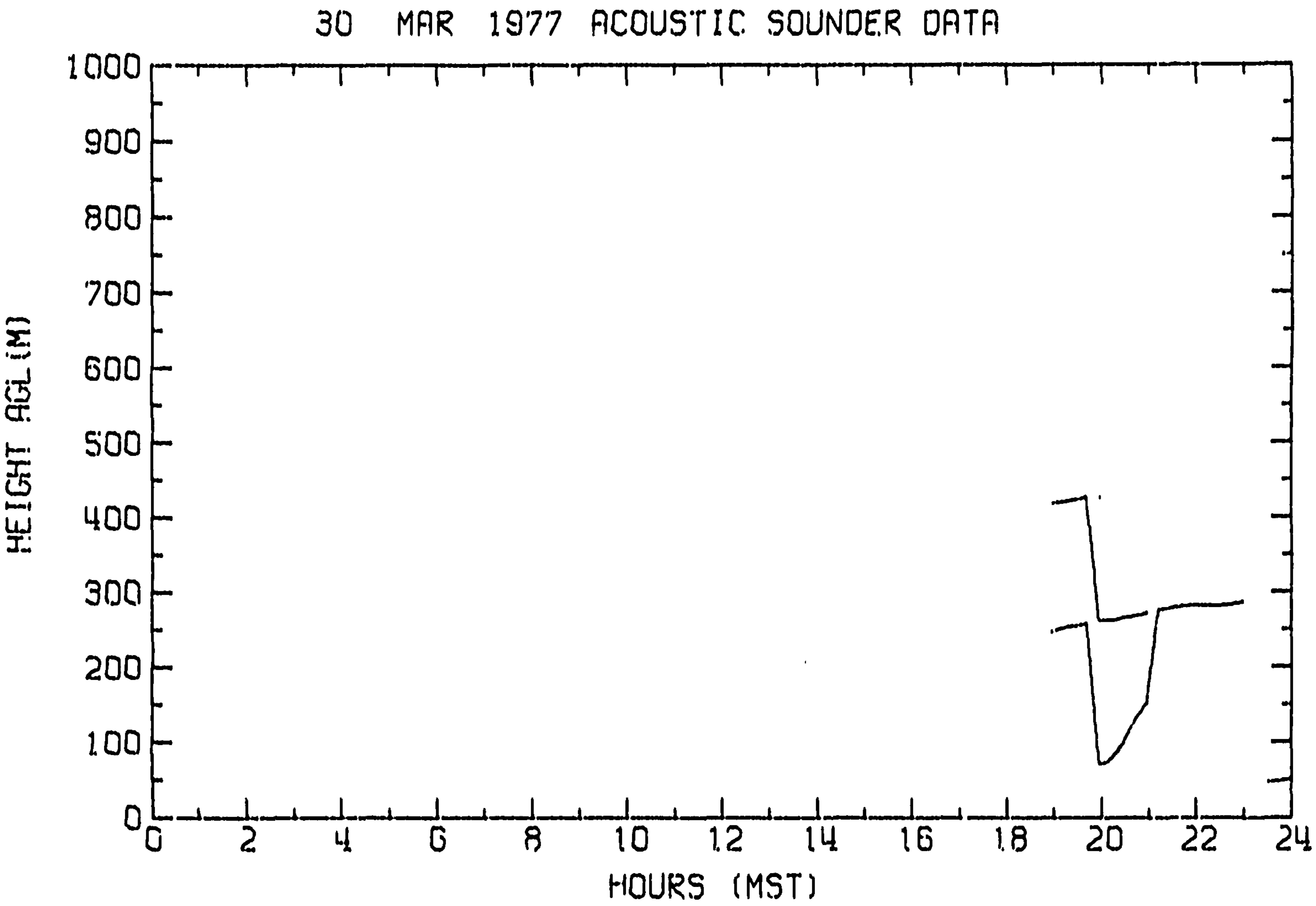


Figure 56. Inversion heights, LSTC, 30 March 1977.

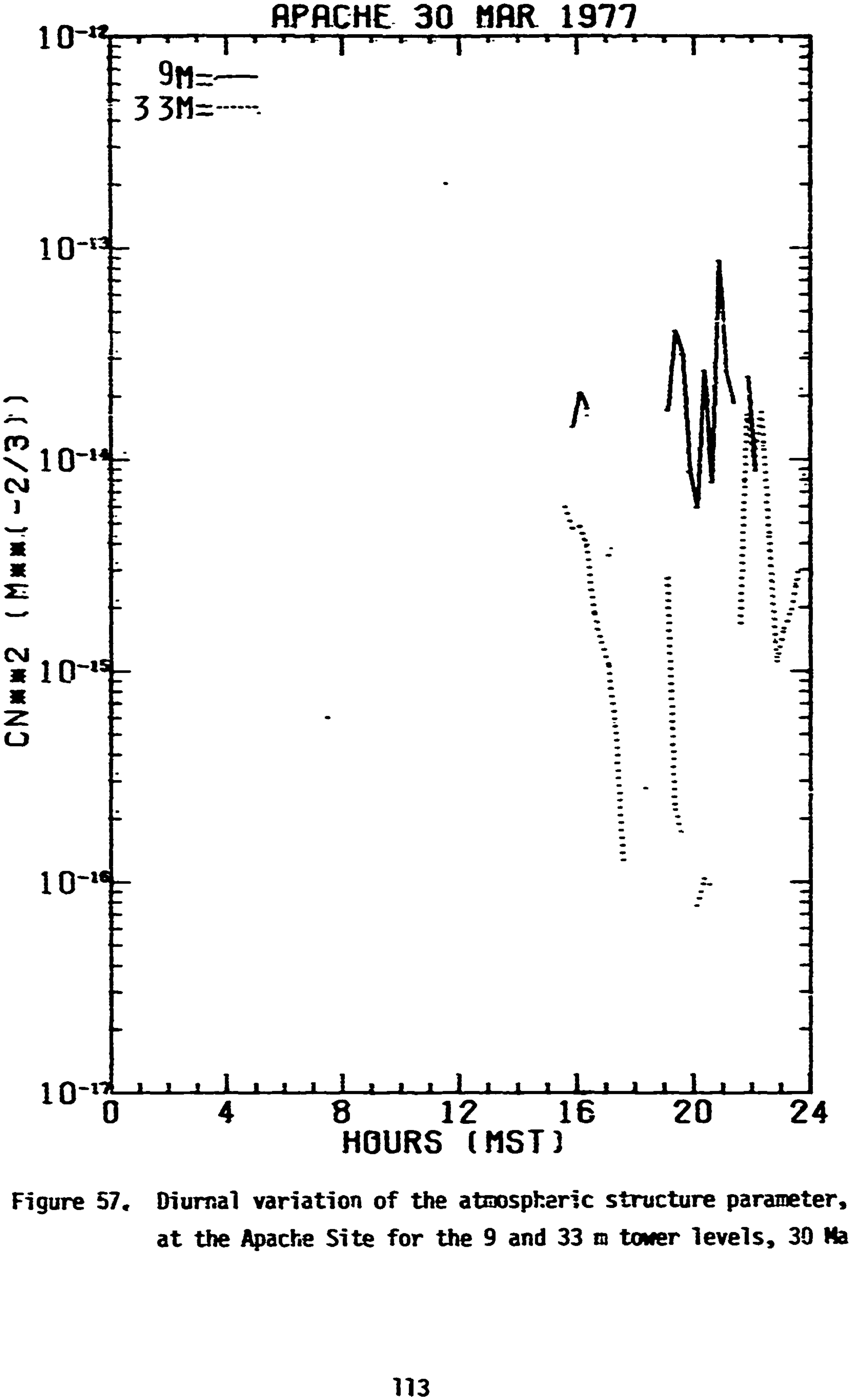


Figure 57. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 30 March 1977.

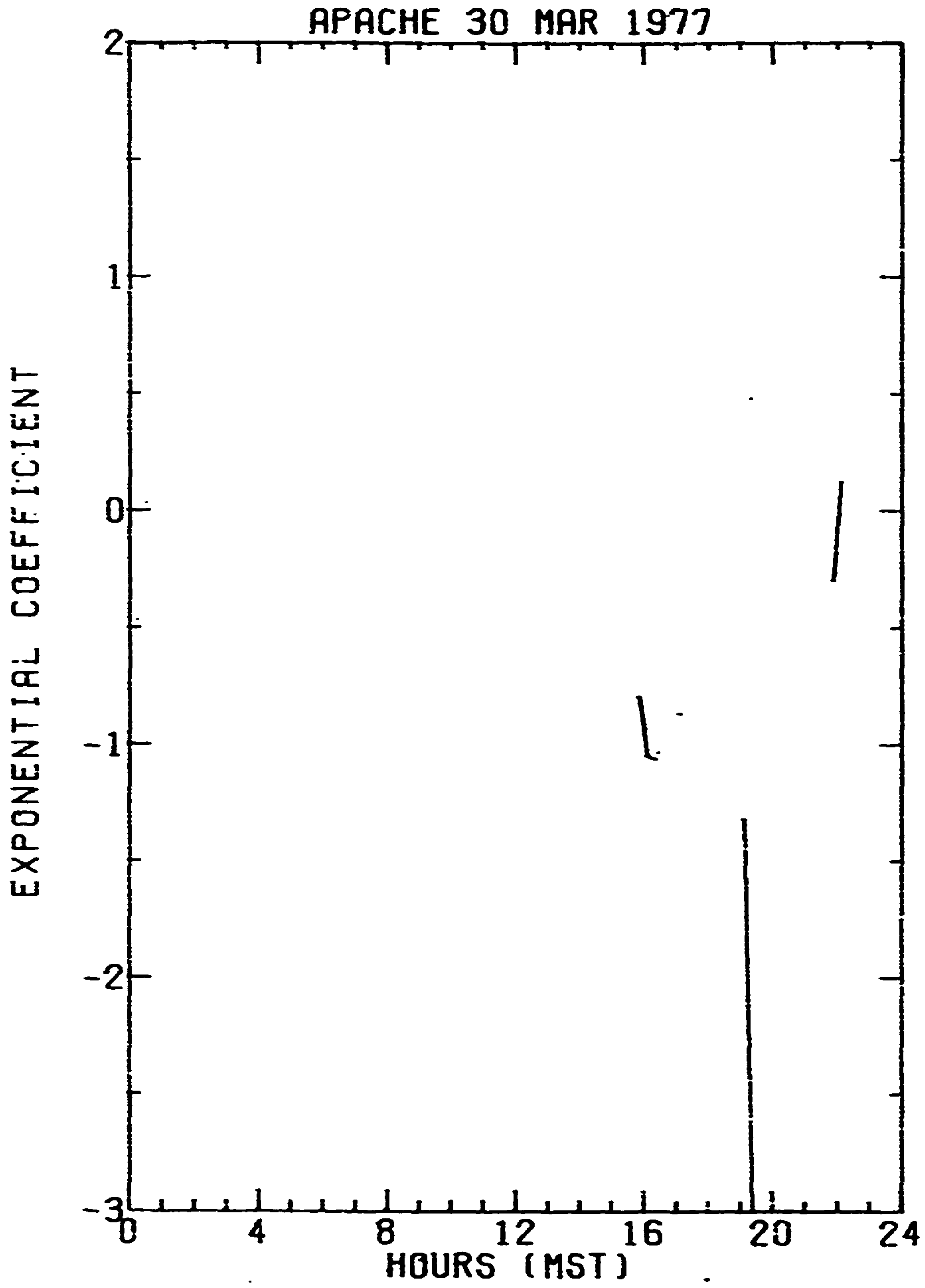


Figure 58. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 30 March 1977.

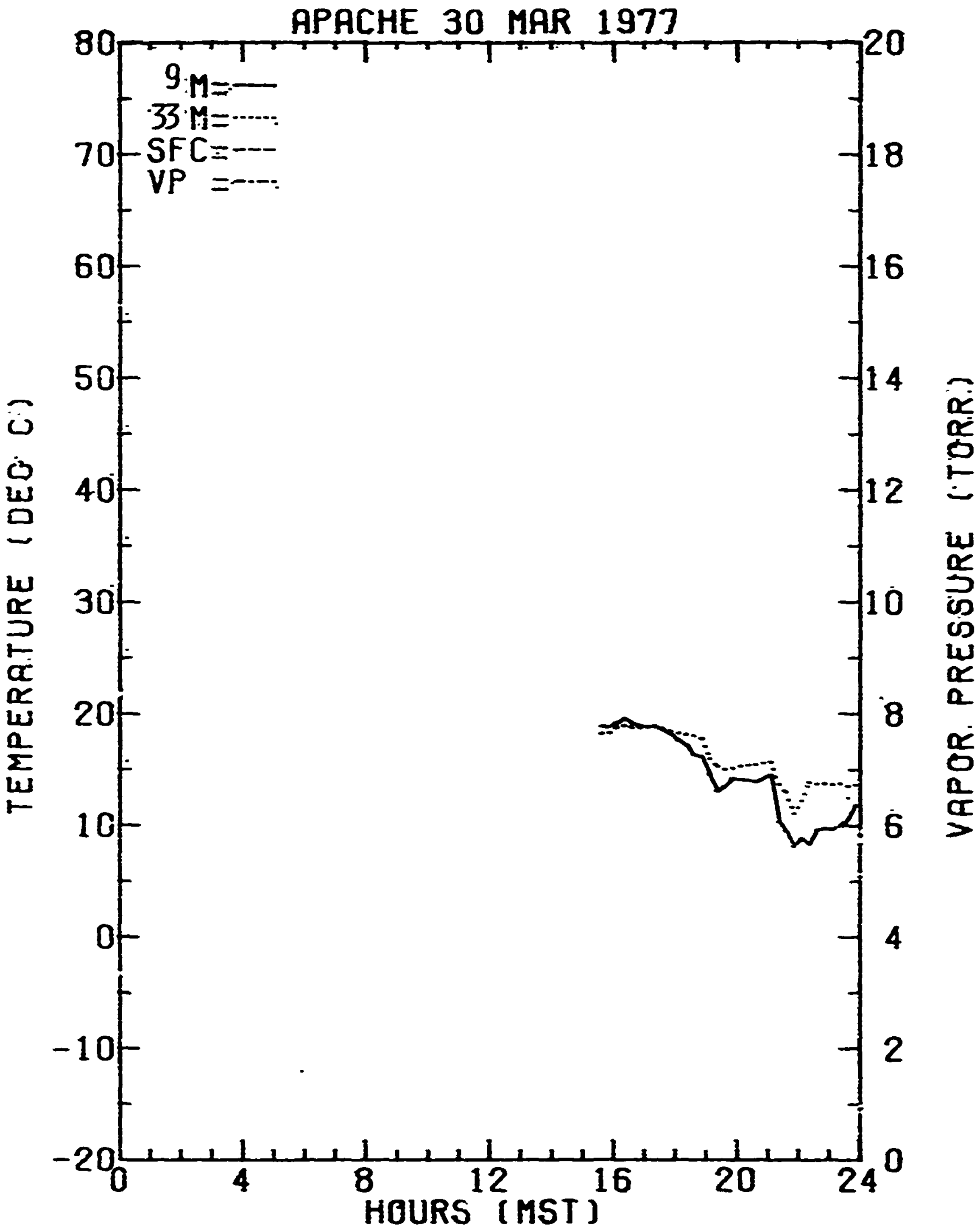


Figure 59. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 30 March 1977.

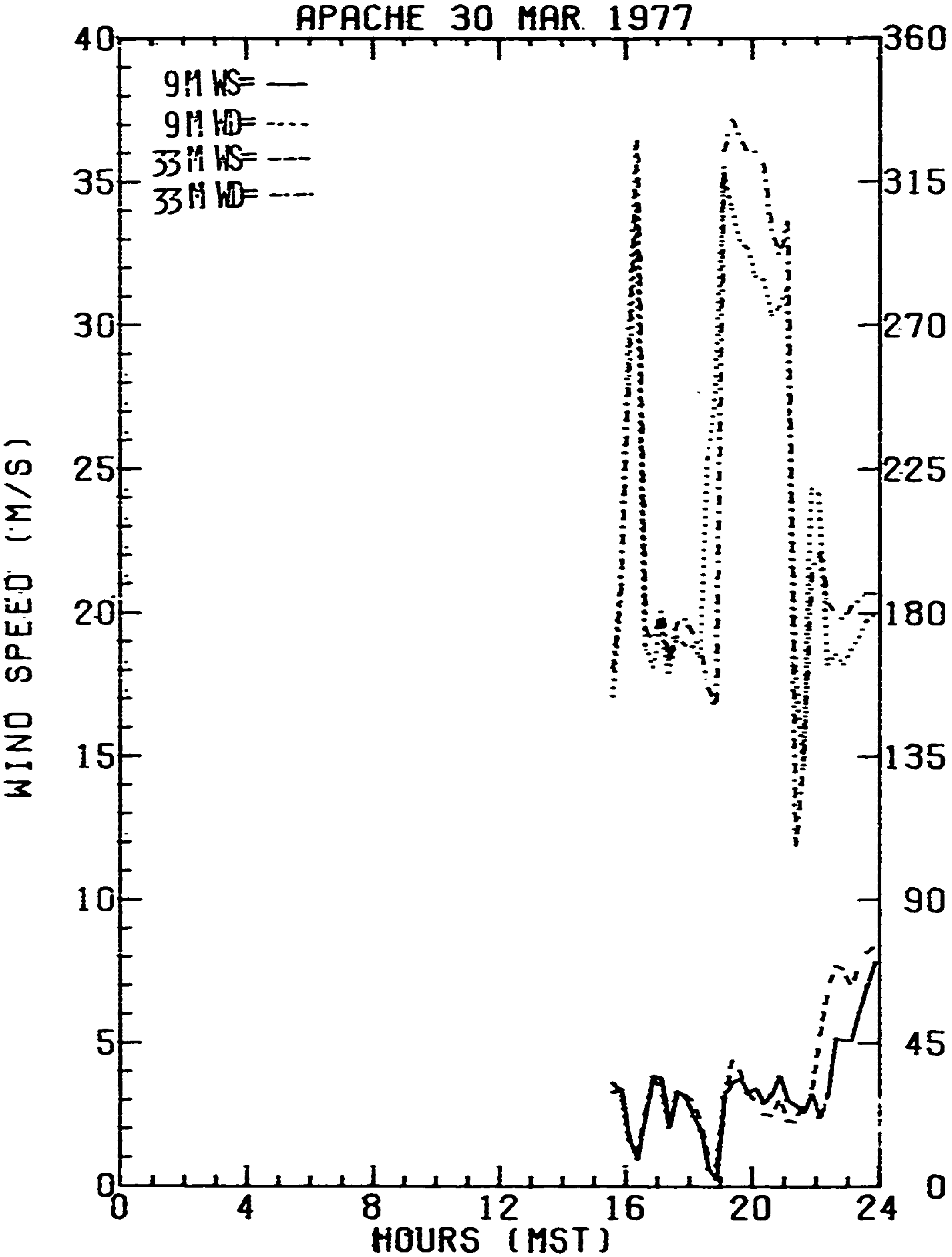


Figure 60. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 30 March 1977.

TABLE 39
APACHE SITE RAWINSONDE DATA

DATE: 30 MAR 77 RELEASE NO.: 18 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	659.7	3.8	2.4	300.0	2.1
126.9	649.5	4.8	2.3	303.1	1.8
279.1	637.5	4.6	2.3	306.2	1.4
[illegible]	624.9	5.6	2.4	316.6	1.1
895.6	591.0	1.9	2.0	285.1	5.7
1460.9	550.8	-1.8	2.6	256.9	15.9
1841.6	525.0	-4.3	1.7	251.5	19.3
2007.9	514.0	-4.7	1.2	253.3	19.7
2264.8	497.5	-5.2	1.0	255.0	20.5
3549.4	421.6	-12.4	0.7	251.3	24.8

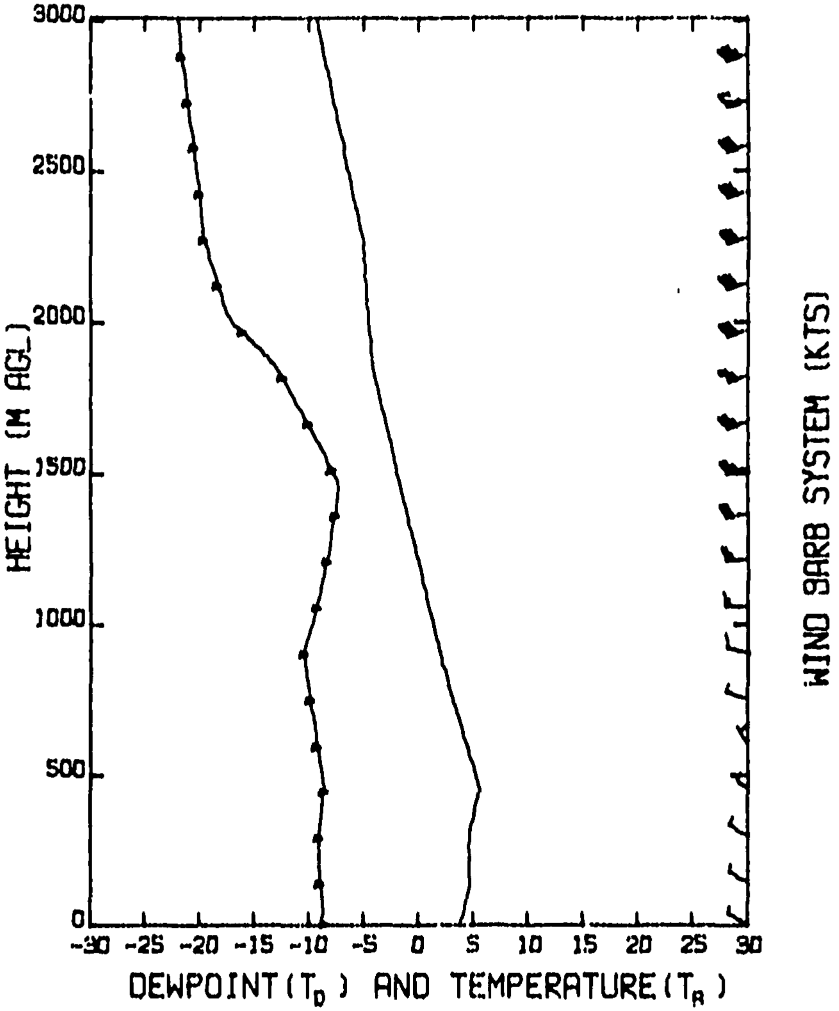


TABLE 40
APACHE SITE RAWINSONDE DATA

DATE: 30 MAR 77 RELEASE NO.: 19 RELEASE TIME: 1235 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	661.4	15.6	3.3	180.0	3.1
68.7	656.1	16.5	2.8	178.6	3.1
312.4	637.5	14.4	2.6	174.2	3.2
1902.7	525.0	-2.8	1.9	215.4	2.0
2514.0	485.7	-8.6	1.7	231.0	9.3
2630.0	478.5	-9.2	1.6	234.2	12.3
2745.1	471.4	-9.0	0.8	236.5	14.8
3243.9	442.0	-9.6	0.7	240.9	20.1

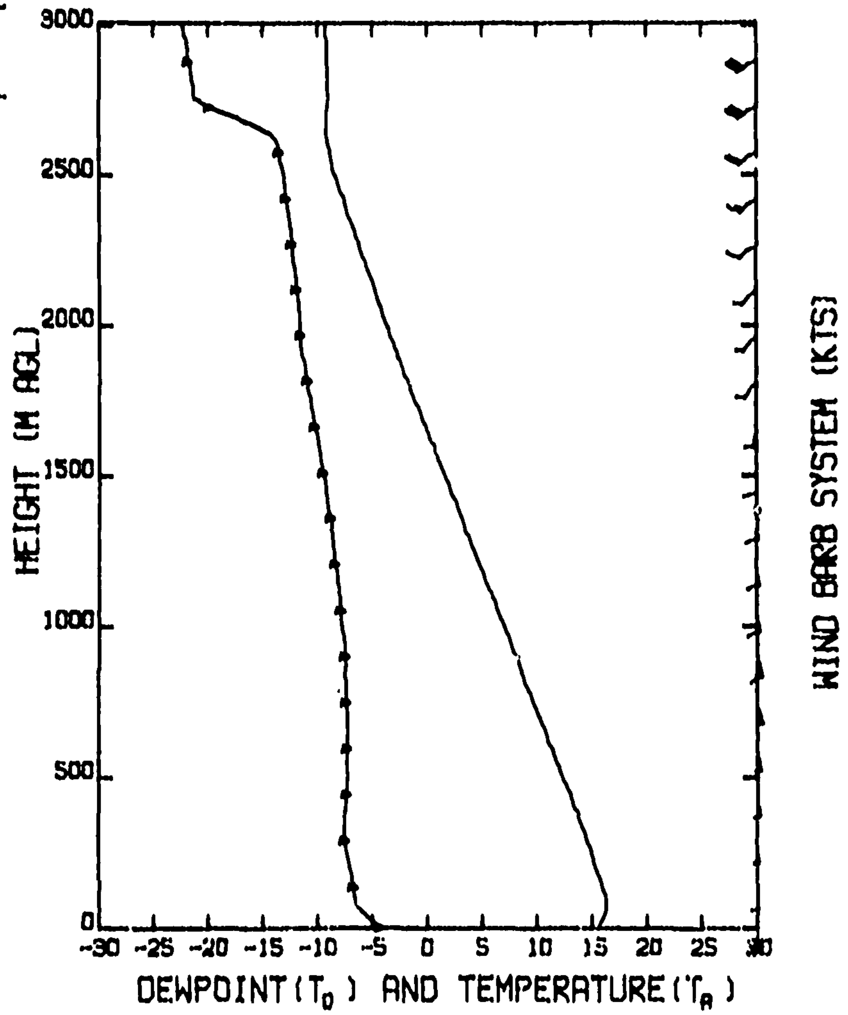


TABLE 41
APACHE SITE RAWINSONDE DATA

DATE: 30 MAR 77 RELEASE NO.: 20 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	659.8	17.0	3.0	150.0	2.1
291.4	637.5	14.5	3.0	175.3	2.5
1890.3	525.0	0.1	1.5	223.8	10.4
2465.4	488.4	-4.4	1.2	229.1	15.2
3525.5	426.4	-9.5	0.5	237.0	21.9

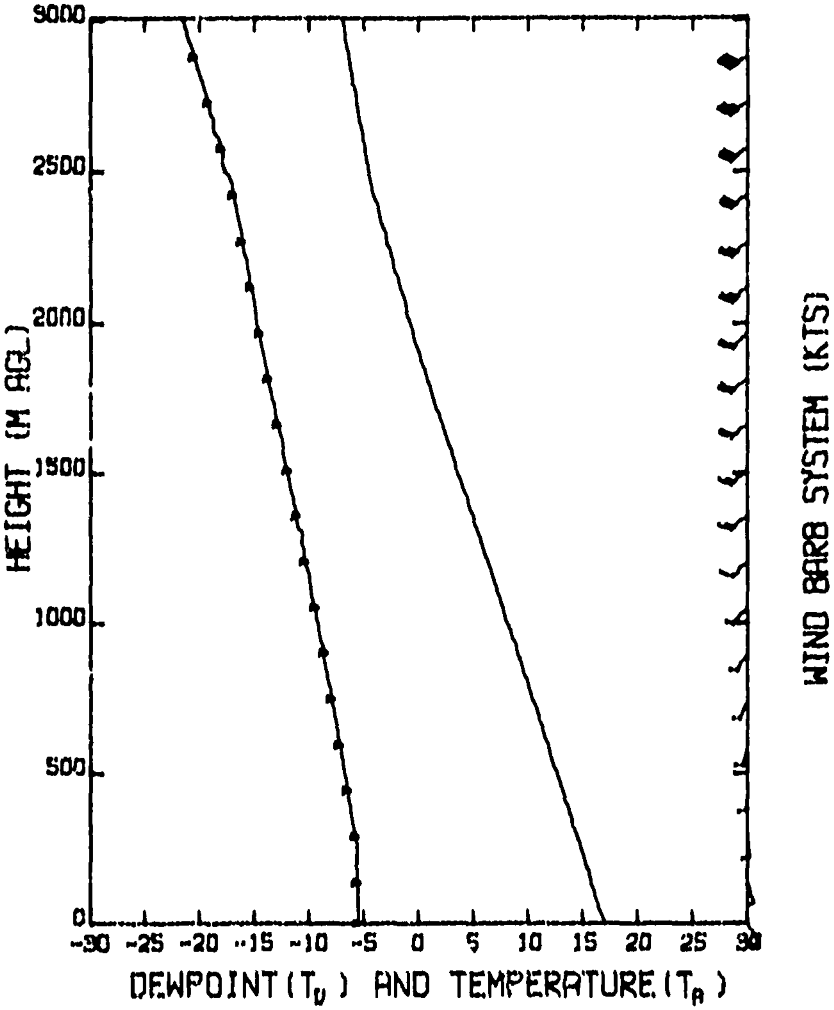
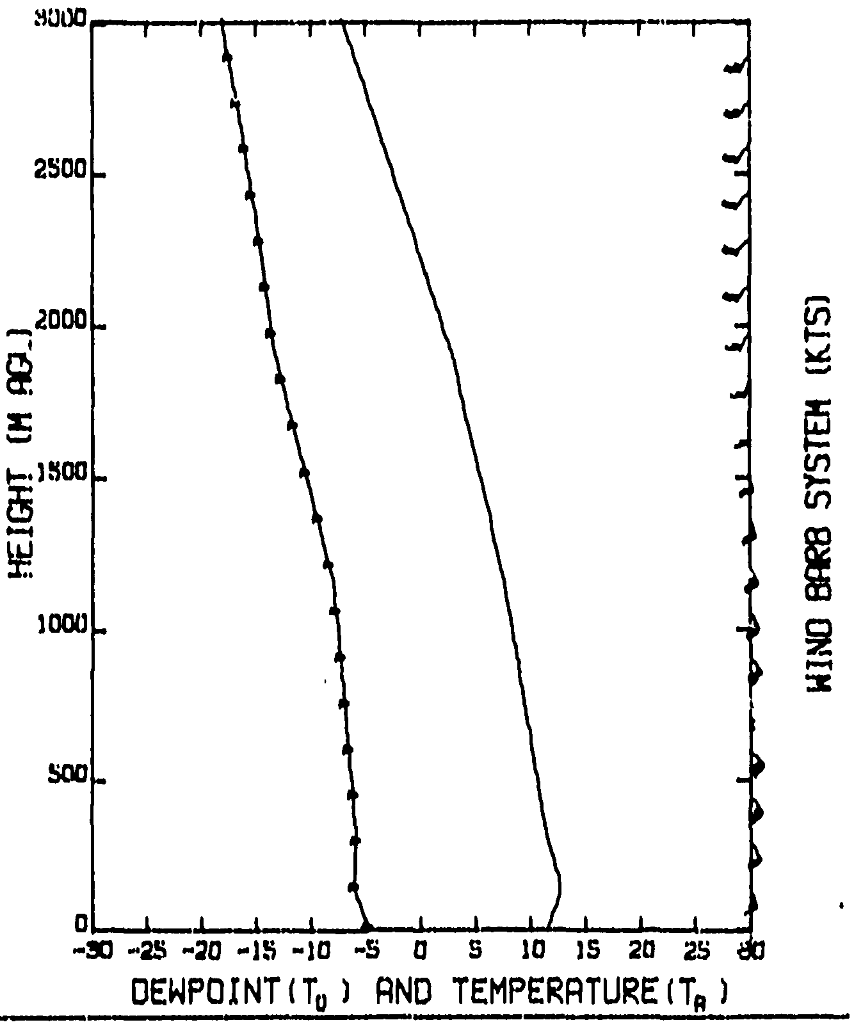


TABLE 42
APACHE SITE RAWINSONDE DATA

DATE: 30 MAR 77 RELEASE NO.: 21 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	660.8	11.6	3.2	180.0	6.2
125.5	651.0	12.9	2.9	164.1	8.3
301.2	637.5	11.5	2.9	154.2	11.0
1143.5	576.0	7.6	2.5	159.6	12.4
1901.4	525.0	2.8	1.6	202.0	8.8
3316.6	439.0	-10.0	0.9	203.7	17.6



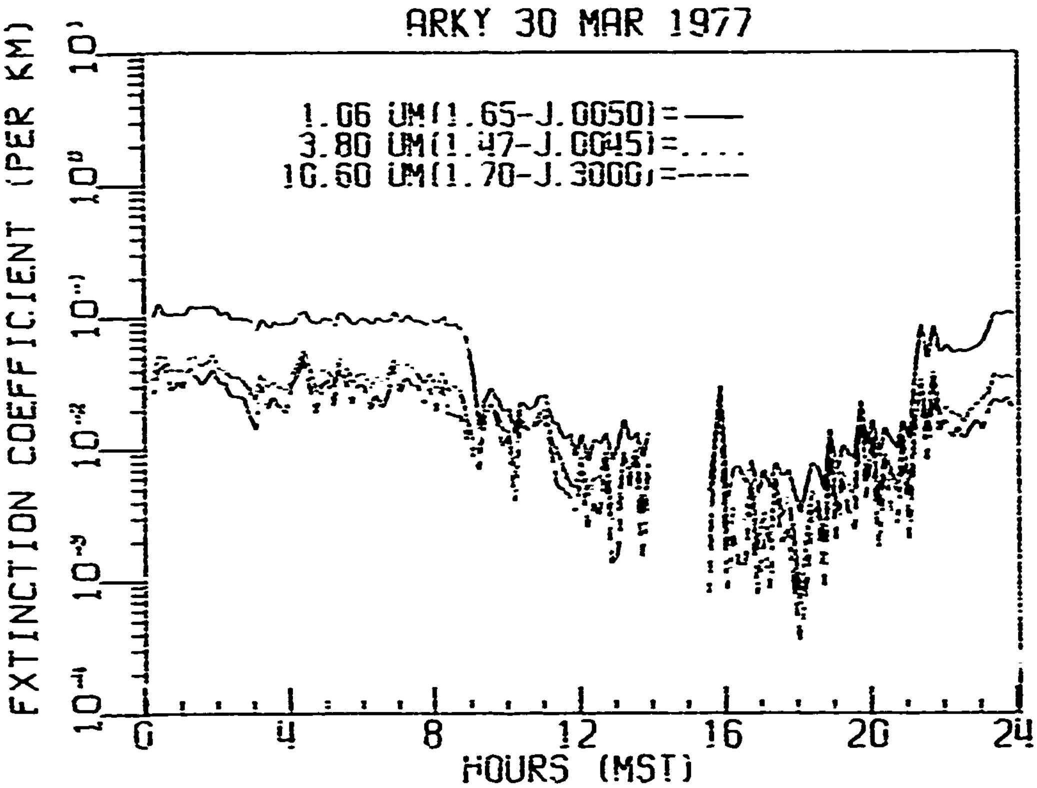


Figure 61. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 30 March 1977.

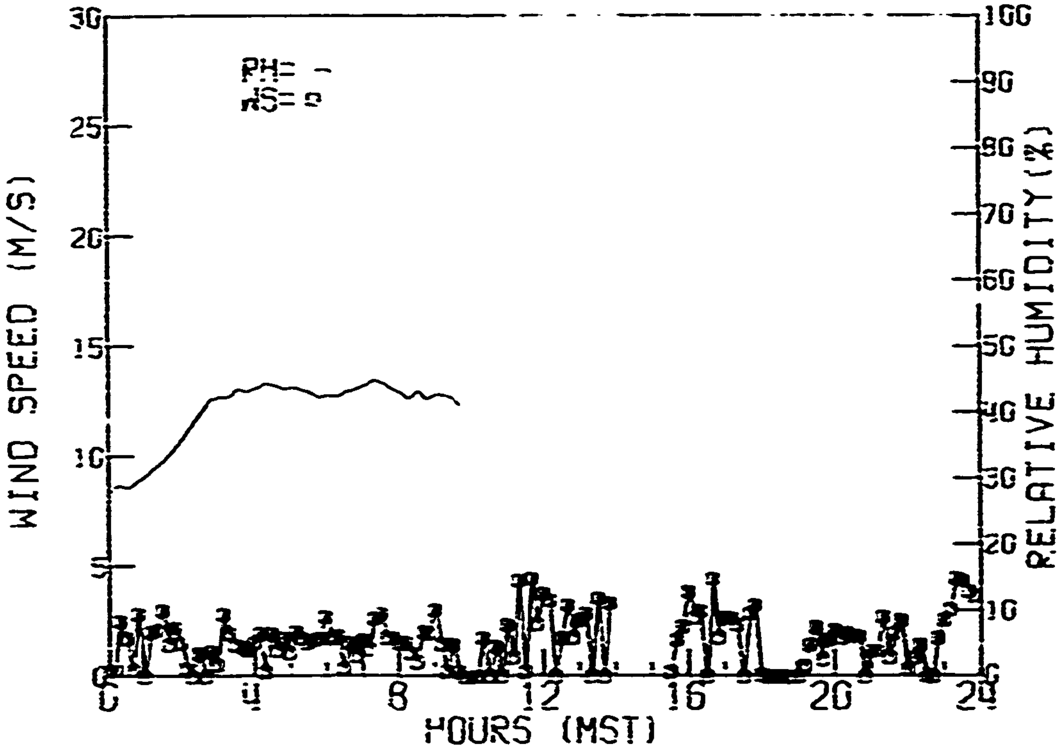


Figure 62. Diurnal variation of windspeed and relative humidity, Arky Site, 30 March 1977.

TABLE 43

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
30 MAR 77														
	00:00:00	600	.18+02	.20+01	.67+00	.46-01	.96-01	.20-01	.00	.00	.96-01	.33-01	.25-01	284.
	00:10:00	600	.14+02	.22+01	.85+00	.76-01	.11+00	.00	.00	.00	.98-01	.35-01	.25-01	237.
	00:20:00	600	.22+02	.28+01	.11+01	.12+00	.96-01	.39-01	.00	.00	.13+00	.53-01	.40-01	457.
	00:30:00	600	.15+02	.23+01	.55+00	.91-01	.11+00	.77-01	.00	.00	.11+00	.51-01	.45-01	587.
	00:40:00	600	.19+02	.21+01	.73+00	.14+00	.88-01	.20-01	.00	.00	.11+00	.40-01	.29-01	337.
	00:50:00	600	.17+02	.25+01	.92+00	.76-01	.95-01	.37-01	.00	.00	.11+00	.43-01	.32-01	393.
	01:00:00	600	.19+02	.22+01	.97+00	.11+00	.19+00	.00	.00	.00	.11+00	.41-01	.31-01	271.
	01:10:00	600	.23+02	.26+01	.75+00	.12+00	.17+00	.37-01	.00	.00	.12+00	.51-01	.42-01	459.
	01:20:00	600	.20+02	.30+01	.11+01	.18+00	.96-01	.20-01	.00	.00	.12+00	.52-01	.38-01	394.
	01:30:00	600	.22+02	.28+01	.97+00	.51-01	.11+00	.23-01	.00	.00	.12+00	.44-01	.32-01	345.
	01:40:00	600	.22+02	.28+01	.11+01	.11+00	.24+00	.00	.00	.00	.12+00	.47-01	.36-01	310.
	01:50:00	600	.23+02	.24+01	.79+00	.19+00	.00	.57-01	.00	.00	.12+00	.53-01	.41-01	527.
	02:00:00	600	.19+02	.22+01	.67+00	.76-01	.96-01	.39-01	.00	.00	.11+00	.41-01	.33-01	392.
	02:10:00	600	.17+02	.26+01	.75+00	.56-01	.17+00	.23-01	.00	.00	.11+00	.43-01	.32-01	322.
	02:20:00	600	.19+02	.21+01	.73+00	.46-01	.00	.39-01	.00	.00	.10+00	.36-01	.26-01	353.
	02:30:00	600	.19+02	.23+01	.51+00	.12+00	.00	.27-01	.00	.00	.98-01	.35-01	.25-01	311.
	02:40:00	600	.18+02	.20+01	.76+00	.76-01	.18+00	.00	.00	.00	.97-01	.33-01	.24-01	273.
	02:50:00	600	.15+02	.24+01	.59+00	.61-01	.45-01	.00	.00	.00	.95-01	.29-01	.19-01	211.
	03:00:00	600	.16+02	.19+01	.98+00	.61-01	.00	.00	.00	.00	.81-01	.24-01	.14-01	178.
	03:10:00	600	.15+02	.21+01	[illegible]	.12+00	.95-01	.23-01	.00	.00	.96-01	.43-01	.30-01	329.
	03:20:00	600	.16+02	.20+01	.67+00	.76-01	.96-01	.00	.00	.00	.88-01	.30-01	.21-01	210.
	03:30:00	600	.15+02	.22+01	.52+00	.11+00	.15+00	.00	.00	.00	.92-01	.33-01	.25-01	235.
	03:40:00	600	.17+02	.20+01	.67+00	.30-01	.48-01	.20-01	.00	.00	.89-01	.30-01	.21-01	258.
	03:50:00	600	.17+02	.23+01	.59+00	.56-01	.00	.23-01	.00	.00	.89-01	.29-01	.19-01	259.
	04:00:00	600	.16+02	.20+01	.52+00	.46-01	.14+00	.39-01	.00	.00	.93-01	.37-01	.31-01	355.
	04:10:00	600	.17+02	.24+01	.55+00	.71-01	.17+00	.37-01	.00	.00	.10+00	.44-01	.35-01	404.
	04:20:00	600	.17+02	.21+01	.61+00	.17+00	.00	.98-01	.00	.00	.11+00	.57-01	.49-01	649.
	04:30:00	600	.15+02	.24+01	.73+00	.12+00	.95-01	.27-01	.00	.00	.94-01	.43-01	.30-01	319.
	04:40:00	600	.17+02	.19+01	.52+00	.61-01	.96-01	.00	.00	.00	.89-01	.27-01	.20-01	204.
	04:50:00	600	.15+02	.25+01	.65+00	.15+00	.49-01	.23-01	.00	.00	.98-01	.41-01	.30-01	332.
	05:00:00	600	.17+02	.17+01	.79+00	.76-01	.14+00	.39-01	.00	.00	.99-01	.41-01	.34-01	391.
	05:10:00	600	.15+02	.23+01	.52+00	.41-01	.49-01	.23-01	.00	.00	.88-01	.33-01	.22-01	269.
	05:20:00	600	.18+02	.24+01	.67+00	.17+00	.14+00	.39-01	.00	.00	.11+00	.50-01	.41-01	446.
	05:30:00	600	.17+02	.21+01	.89+00	.15+00	.95-01	.23-01	.00	.00	.10+00	.44-01	.33-01	343.
	05:40:00	600	.16+02	.23+01	.89+00	.46-01	.14+00	.00	.00	.00	.89-01	.32-01	.23-01	206.
	05:50:00	600	.17+02	.19+01	.61+00	.76-01	.17+00	.23-01	.00	.00	.96-01	.37-01	.31-01	309.
	06:00:00	600	.17+02	.19+01	.73+00	.91-01	.14+00	.20-01	.00	.00	.96-01	.38-01	.30-01	371.
	06:10:00	600	.17+02	.23+01	.55+00	.76-01	.95-01	.00	.00	.00	.89-01	.29-01	.21-01	211.
	06:20:00	600	.17+02	.27+01	.61+00	.91-01	.88-01	.20-01	.00	.00	.98-01	.36-01	.26-01	303.
	06:30:00	600	.17+02	.23+01	.64+00	.61-01	.00	.23-01	.00	.00	.91-01	.32-01	.21-01	274.
	06:40:00	600	.17+02	.21+01	.73+00	.14+00	.96-01	.00	.00	.00	.94-01	.36-01	.26-01	250.

TABLE 43 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
30 MAR 77														
	06:50:00	600	.17+02	.21+01	.67+00	.61-01	.24+00	.59-01	.00	.00	.11+00	.40-01	.44-01	475.
	07:00:00	599	.15+02	.20+01	.99+00	.12+00	.49-01	.20-01	.00	.00	.94-01	.39-01	.29-01	312.
	07:10:00	600	.17+02	.23+01	.85+00	.61-01	.48-01	.59-01	.00	.00	.10+00	.45-01	.35-01	445.
	07:20:00	599	.15+02	.20+01	.92+00	.14+00	.95-01	.20-01	.00	.00	.75-01	.41-01	.31-01	325.
	07:30:00	600	.16+02	.16+01	.61+00	.61-01	.96-01	.39-01	.00	.00	.93-01	.36-01	.30-01	356.
	07:40:00	599	.15+02	.20+01	.76+00	.46-01	.40-01	.20-01	.00	.00	.87-01	.32-01	.22-01	263.
	07:50:00	600	.17+02	.19+01	.70+00	.91-01	.14+00	.20-01	.00	.00	.97-01	.38-01	.30-01	372.
	08:00:00	599	.17+02	.26+01	.93+00	.61-01	.95-01	.00	.00	.00	.91-01	.29-01	.20-01	210.
	08:10:00	600	.18+02	.24+01	.79+00	.61-01	.14+00	.20-01	.00	.00	.10+00	.38-01	.29-01	309.
	08:20:00	599	.15+02	.20+01	.67+00	.46-01	.95-01	.00	.00	.00	.87-01	.28-01	.19-01	194.
	08:30:00	600	.16+02	.22+01	.94+00	.76-01	.00	.00	.00	.00	.88-01	.31-01	.18-01	201.
	08:40:00	599	.15+02	.15+01	.55+00	.12+00	.00	.00	.00	.00	.80-01	.27-01	.19-01	294.
	08:50:00	600	.15+02	.99+00	.21+00	.15-01	.00	.20-01	.00	.00	.69-01	.18-01	.13-01	204.
	09:00:00	599	.76+01	.73+00	.51-01	.19-01	.00	.20-01	.00	.00	.39-01	.12-01	.79-02	157.
	09:10:00	600	.13+01	.67+00	.21+00	.30-01	.48-01	.00	.00	.00	.14-01	.92-02	.70-02	49.
	09:20:00	599	.17+01	.73+00	.21+00	.45-01	.95-01	.20-01	.00	.00	.23-01	.17-01	.15-01	197.
	09:30:00	600	.18+01	.88+00	.10+00	.15-01	.48-01	.59-01	.00	.00	.29-01	.22-01	.22-01	286.
	09:40:00	599	.15+01	.57+00	.30+00	.51-01	.95-01	.20-01	.00	.00	.21-01	.19-01	.17-01	167.
	09:50:00	600	.17+01	.75+00	.37+00	.30-01	.00	.20-01	.00	.00	.20-01	.14-01	.11-01	127.
	10:00:00	599	.17+01	.71+00	.14+00	.30-01	.45-01	.20-01	.00	.00	.20-01	.14-01	.12-01	131.
	10:10:00	600	.19+01	.60+00	.12+00	.30-01	.00	.00	.00	.00	.13-01	.66-02	.41-02	40.
	10:20:00	599	.17+01	.97+00	.21+00	.61-01	.00	.30-01	.00	.00	.23-01	.19-01	.17-01	217.
	10:30:00	600	.15+01	.64+00	.33+00	.15-01	.19+00	.00	.00	.00	.20-01	.14-01	.14-01	71.
	10:40:00	599	.17+01	.57+00	.27+00	.76-01	.95-01	.00	.00	.00	.20-01	.11-01	.13-01	97.
	10:50:00	600	.20+01	.84+00	.37+00	.30-01	.96-01	.20-01	.00	.00	.25-01	.18-01	.16-01	148.
	11:00:00	599	.20+01	.69+00	.15+00	.76-01	.00	.30-01	.00	.00	.25-01	.20-01	.19-01	237.
	11:10:00	600	.14+01	.58+00	.91-01	.46-01	.00	.20-01	.00	.00	.16-01	.12-01	.10-01	125.
	11:20:00	599	.17+01	.77+00	.37+00	.30-01	.00	.00	.00	.00	.16-01	.97-02	.59-02	47.
	11:30:00	600	.15+01	.45+00	.15+00	.46-01	.00	.00	.00	.00	.12-01	.74-02	.49-02	45.
	11:40:00	599	.14+01	.44+00	.12+00	.00	.45-01	.00	.00	.00	.15-01	.55-02	.44-02	31.
	11:50:00	600	.12+01	.36+00	.91-01	.30-01	.00	.00	.00	.00	.90-02	.51-02	.34-02	32.
	12:00:00	599	.12+01	.49+00	.24+00	.30-01	.49-01	.00	.00	.00	.13-01	.89-02	.59-02	45.
	12:10:00	600	.11+01	.30+00	.15+00	.15-01	.00	.00	.00	.00	.82-02	.44-02	.25-02	23.
	12:20:00	599	.15+01	.49+00	.12+00	.30-01	.00	.00	.00	.00	.12-01	.51-02	.34-02	37.
	12:30:00	600	.15+01	.45+00	.24+00	.15-01	.00	.00	.00	.00	.11-01	.61-02	.33-02	30.
	12:40:00	599	.12+01	.34+00	.71-01	.30-01	.00	.20-01	.00	.00	.13-01	.97-02	.96-02	112.
	12:50:00	600	.13+01	.47+00	.61-01	.00	.00	.00	.00	.00	.83-02	.29-02	.14-02	16.
	13:00:00	599	.14+01	.54+00	.61-01	.00	.00	.00	.00	.00	.11-01	.33-02	.16-02	21.
	13:10:00	600	.18+01	.56+00	.15+00	.00	.14+00	.00	.00	.00	.17-01	.92-02	.97-02	90.
	13:20:00	599	.14+01	.51+00	.12+00	.15-01	.49-01	.00	.00	.00	.11-01	.61-02	.53-02	35.
	13:30:00	600	.12+01	.24+00	.15+00	.30-01	.00	.20-01	.00	.00	.13-01	.10-01	.87-02	112.

TABLE 43 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
30 MAR 77													
15:10:00	600	.15+01	.36+00	.12+00	.00	.00	.00	.00	.00	.87-02	.32-02	.15-02	17.
15:20:00	500	.15+01	.59+00	.12+00	.30-01	.45-01	.00	.00	.00	.13-01	.79-02	.54-02	45.
15:30:00	600	.88+00	.19+00	.61-01	.00	.00	.00	.00	.00	.49-02	.17-02	.82-03	9.
15:40:00	500	.11+01	.26+00	.30-01	.15-01	.45-01	.20-01	.00	.00	.13-01	.91-02	.27-02	107.
15:50:00	600	.57+00	.49+00	.27+00	.76-01	.18+00	.59-01	.00	.00	.30-01	.29-01	.31-01	327.
16:00:00	500	.67+00	.15+00	.91-01	.00	.00	.00	.00	.00	.43-02	.18-02	.96-03	9.
16:10:00	600	.10+01	.30+00	.91-01	.19-01	.00	.00	.00	.00	.72-02	.37-02	.22-02	21.
16:20:00	500	.11+01	.43+00	.91-01	.00	.00	.00	.00	.00	.74-02	.33-02	.14-02	15.
16:30:00	600	.79+00	.26+00	.19+00	.00	.00	.00	.00	.00	.56-02	.29-02	.13-02	12.
16:40:00	500	.75+00	.19+00	.00	.00	.00	.20-01	.00	.00	.92-02	.55-02	.57-02	49.
16:50:00	600	.69+00	.21+00	.61-01	.00	.00	.00	.00	.00	.44-02	.17-02	.81-03	9.
17:00:00	500	.11+01	.31+00	.71-01	.19-01	.00	.00	.00	.00	.69-02	.34-02	.21-02	22.
17:10:00	600	.84+00	.26+00	.61-01	.00	.00	.00	.00	.00	.52-02	.19-02	.91-03	10.
17:20:00	500	.61+00	.15+00	.61-01	.00	.00	.20-01	.00	.00	.79-02	.51-02	.59-02	49.
17:30:00	600	.91+00	.26+00	.61-01	.15-01	.00	.00	.00	.00	.63-02	.31-02	.20-02	14.
17:40:00	500	.71+00	.35+00	.15+00	.15-01	.00	.00	.00	.00	.59-02	.43-02	.25-02	21.
17:50:00	600	.67+00	.28+00	.41-01	.00	.00	.00	.00	.00	.49-02	.23-02	.10-02	10.
18:00:00	500	.73+00	.11+00	.00	.00	.00	.00	.00	.00	.33-02	.55-03	.36-03	5.
18:10:00	600	.86+00	.26+00	.61-01	.00	.00	.00	.00	.00	.53-02	.19-02	.92-03	10.
18:20:00	500	.93+00	.34+00	.91-01	.30-01	.00	.00	.00	.00	.79-02	.49-02	.33-02	32.
18:30:00	600	.78+00	.21+00	.12+00	.00	.48-01	.00	.00	.00	.71-02	.40-02	.37-02	20.
18:40:00	500	.75+00	.29+00	.51-01	.00	.00	.00	.00	.00	.53-02	.23-02	.12-02	17.
18:50:00	600	.13+01	.21+00	.36-01	.46-01	.48-01	.20-01	.00	.00	.14-01	.11-01	.12-01	125.
19:00:00	500	.82+00	.34+00	.61-01	.15-01	.00	.00	.00	.00	.65-02	.34-02	.21-02	22.
19:10:00	600	.11+01	.36+00	.91-01	.30-01	.48-01	.00	.00	.00	.11-01	.67-02	.59-02	40.
19:20:00	500	.12+01	.36+00	.12+00	.30-01	.00	.00	.00	.00	.93-02	.55-02	.35-02	32.
19:30:00	600	.12+01	.34+00	.12+00	.15-01	.00	.00	.00	.00	.85-02	.42-02	.25-02	24.
19:40:00	500	.13+01	.45+00	.15+00	.45-01	.95-01	.32-01	.00	.00	.24-01	.22-01	.20-01	223.
19:50:00	600	.13+01	.43+00	.18+00	.00	.48-01	.00	.00	.00	.11-01	.57-02	.44-02	28.
20:00:00	500	.15+01	.34+00	.27+00	.15-01	.45-01	.20-01	.00	.00	.17-01	.12-01	.11-01	119.
20:10:00	600	.13+01	.36+00	.18+00	.00	.00	.00	.00	.00	.88-02	.39-02	.18-02	18.
20:20:00	500	.15+01	.47+00	.12+00	.15-01	.00	.20-01	.00	.00	.15-01	.94-02	.97-02	109.
20:30:00	600	.14+01	.49+00	.30+00	.19-01	.00	.00	[illegible]	.00	.12-01	.69-02	.36-02	31.
20:40:00	500	.15+01	.45+00	.12+00	.15-01	.00	.00	.00	.00	.10-01	.47-02	.27-02	27.
20:50:00	600	.12+01	.39+00	.21+00	.30-01	.48-01	.20-01	.00	.00	.17-01	.13-01	.12-01	125.
21:00:00	500	.20+01	.56+00	.15+00	.00	.00	.00	.00	.00	.12-01	.45-02	.21-02	24.
21:10:00	600	.76+01	.86+00	.15+00	.46-01	.48-01	.20-01	.00	.00	.44-01	.17-01	.15-01	180.
21:20:00	500	.15+02	.14+01	.54+00	.56-01	.21+00	.20-01	.00	.00	.87-01	.30-01	.31-01	204.
21:30:00	600	.10+02	.10+01	.33+00	.30-01	.00	.00	.00	.00	.49-01	.14-01	.81-02	105.
21:40:00	500	.14+02	.15+01	.46+00	.14+00	.95-01	.32-01	.00	.00	.86-01	.30-01	.33-01	375.
21:50:00	600	.11+02	.97+00	.12+00	.41-01	.48-01	.00	.00	.00	.55-01	.18-01	.14-01	188.

TABLE 43 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
30 MAR 77														
	22:00:00	600	.11+02	.13+01	.30+00	.30-01	.48-01	.20-01	.00	.00	.61-01	.21-01	.17-01	205.
	22:10:00	600	.13+02	.13+01	.43+00	.46-01	.49-01	.00	.00	.00	.55-01	.19-01	.12-01	177.
	22:20:00	600	.11+02	.12+01	.33+00	.00	.48-01	.20-01	.00	.00	.57-01	.19-01	.14-01	183.
	22:30:00	600	.11+02	.88+00	.43+00	.15-01	.95-01	.00	.00	.00	.54-01	.15-01	.12-01	119.
	22:40:00	600	.11+02	.14+01	.33+00	.76-01	.48-01	.00	.00	.00	.58-01	.20-01	.14-01	188.
	22:50:00	600	.11+02	.13+01	.49+00	.61-01	.95-01	.00	.00	.00	.63-01	.22-01	.17-01	154.
	23:00:00	600	.12+02	.16+01	.76+00	.76-01	.00	.00	.00	.00	.66-01	.24-01	.14-01	160.
	23:10:00	600	.15+02	.19+01	.52+00	.56-01	.11+00	.00	.00	.00	.82-01	.27-01	.20-01	191.
	23:20:00	600	.20+02	.26+01	.10+01	.61-01	.00	.20-01	.00	.00	.11+00	.38-01	.24-01	303.
	23:30:00	600	.23+02	.25+01	.67+00	.11+00	.49-01	.00	.00	.00	.11+00	.34-01	.23-01	252.
	23:40:00	600	.21+02	.30+01	.70+00	.46-01	.48-01	.20-01	.00	.00	.21+00	.36-01	.25-01	308.
	23:50:00	600	.23+02	.25+01	.67+00	.12+00	.00	.00	.00	.00	.13+00	.34-01	.21-01	252.

Weather Summary

Date: 31 March 1977

Synoptic

Surface: Weak north-south pressure trough thru central Arizona.

500 Millibar: Northeast-southwest oriented trough thru central California weakening and moving east-southeast. Continued strong southwesterly flow over New Mexico.

Hollcman AFB

Clouds: Mostly clear to scattered low (cumulus) and high (cirrus) clouds with cumulus bases at 2000 m AGL.

Wind: Generally southerly at 5-8 m $\sec^{-1}$ with a midafternoon peak gust of 15 m $\sec^{-1}$ from the south.

Visibility: Generally greater than 16 km.

Maximum temperature:	24.4°C	Corresponding vapor pressure:	3.0 Torr
Minimum temperature:	4.4°C	Corresponding vapor pressure:	3.3 Torr

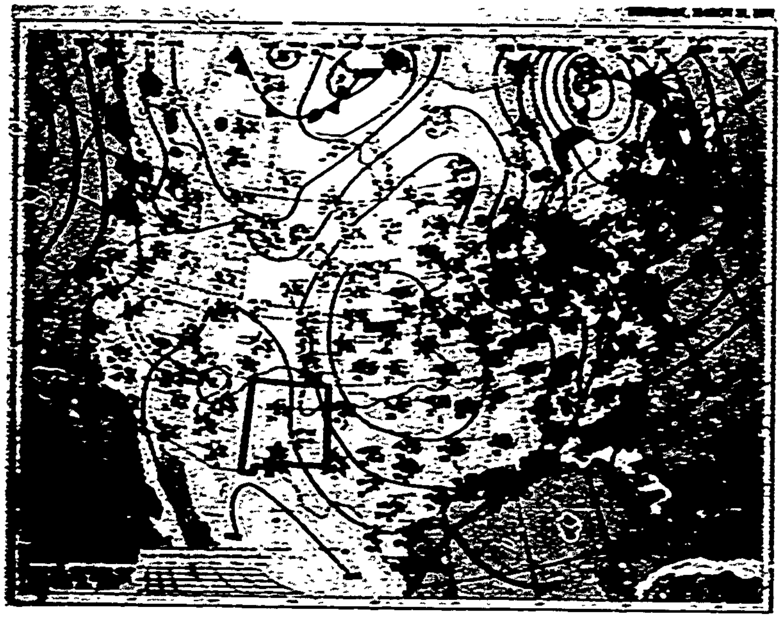


Figure 63a. Surface weather map for 31 March 1977.

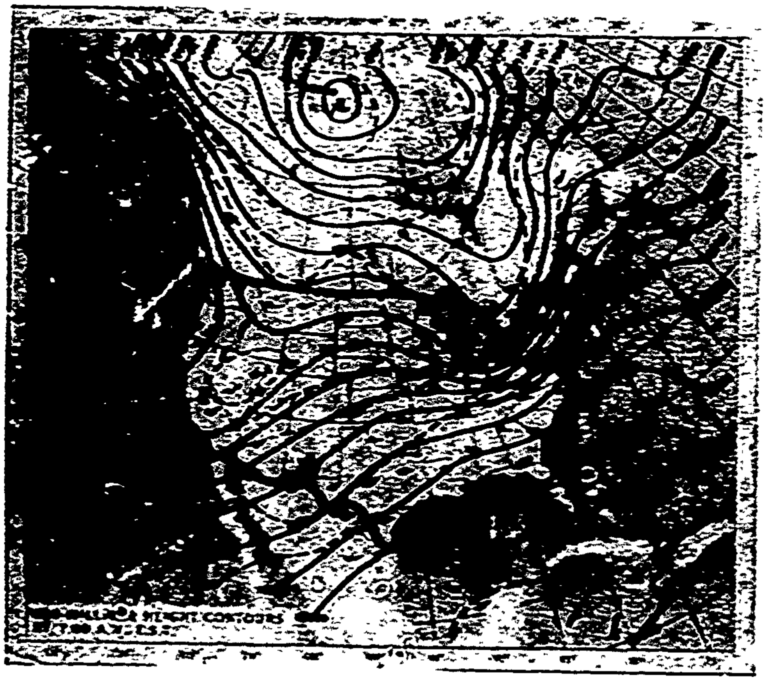


Figure 63b. 500-millibar height contours for 31 March 1977.

TABLE 44. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 31 March 1977 Remarks
0100	10.3	3.4	-3.6	0	0	10 Ci	
0200	9.2	3.4	-3.1	0	0	10 Ci	
0300	8.9	3.8	-2.0	0	0	0	
0400	7.2	4.0	-1.6	0	0	0	
0500	7.8	4.2	-0.7	0	0	0	Plane observed
0600	7.0	4.3	-0.8	0	0	0	32 V straight line on recorder-switching on miniverter
0700	9.7	4.6	0.4	0	0	0	0640 climbed tower - all sensors ok
0800	13.2	4.9	1.1	0	0	0	
0900	16.0	5.5	2.9	0	0	0	EWSS helicopter hovering over van and around tower - possible "Prop Wash" affect on winds
1000	17.1	6.5	4.7	0	0	0	
1100	19.4	5.7	3.0	0	0	0	1030 - plane observed
1200	21.5	5.7	3.1	0	0	0	Apache off 1145-1227-re-cal thermocouples - balance 8 m ΔT removed at 1600
1300	23.0	5.6	2.8	10 Cu	0	0	
1400	23.4	5.3	2.1	10 Cu	0	0	
1500	23.7	5.2	1.7	10 Cu	0	0	
1600	22.6	5.6	2.7	10 Cu	0	0	
1700	22.3	6.0	3.9	10 Cu	0	0	Sctd Cu Alqds
1800	21.2	5.5	2.6	02 Cu	05 As 02 Ac SI	10 Ci 5 Cs	ACSL W Ci INVDG W
1900	19.0	5.1	1.5	0	01 Ac SI	20 Cs	ACSL W
2000	18.1	3.6	-3.4	0	0	100 Ci	
2100	15.7	3.1	-5.3	0	0	80 Cs 20 Ci	
2200	16.3	2.9	-6.1	0	0	90 Cs 10 Ci	
2300	16.3	2.9	-6.1	0	0	50 Cs 10 Ci	
2400	14.9	3.1	-5.4	0	0	10 Cs 10 Ci	

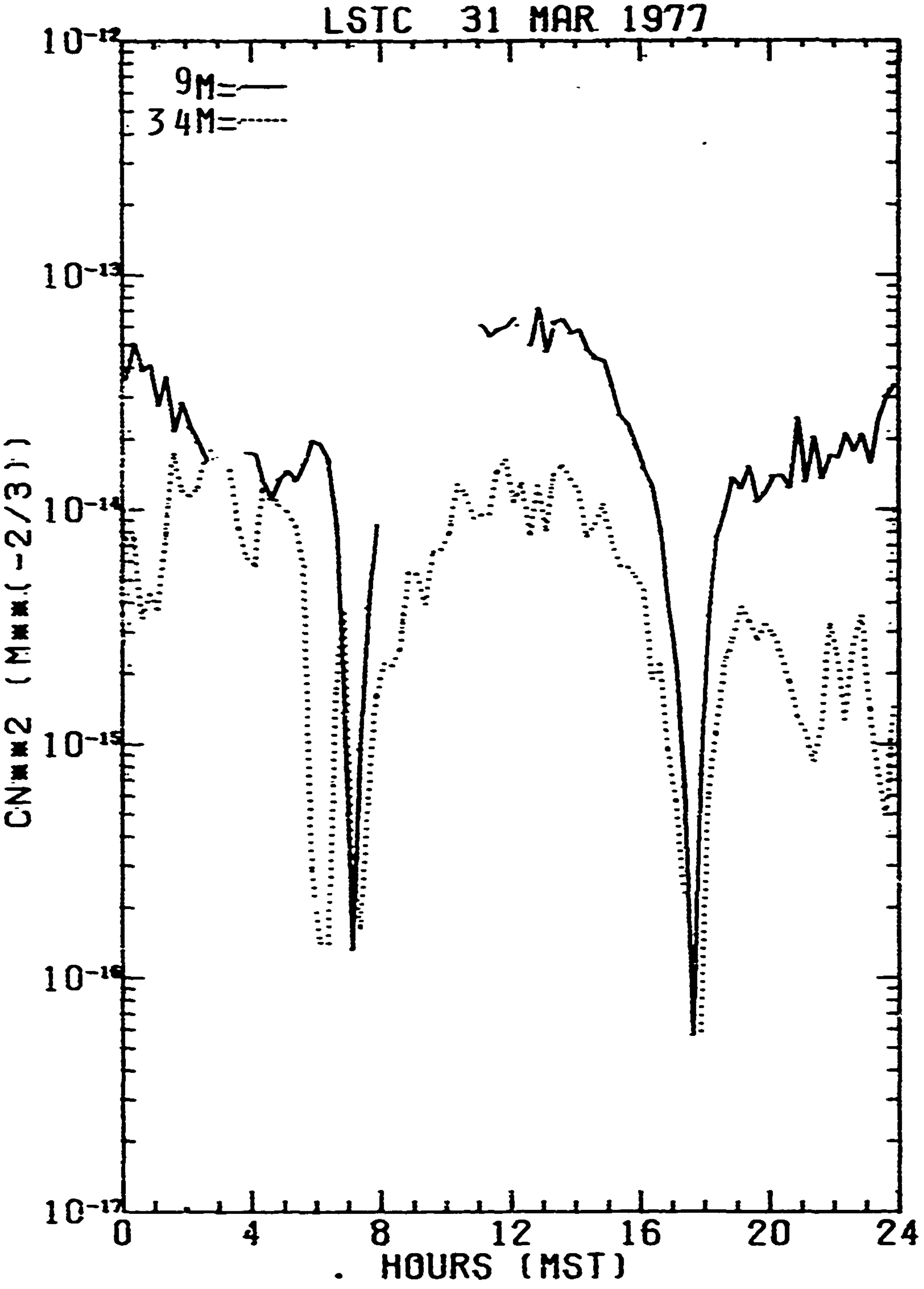


Figure 64. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 31 March 1977.

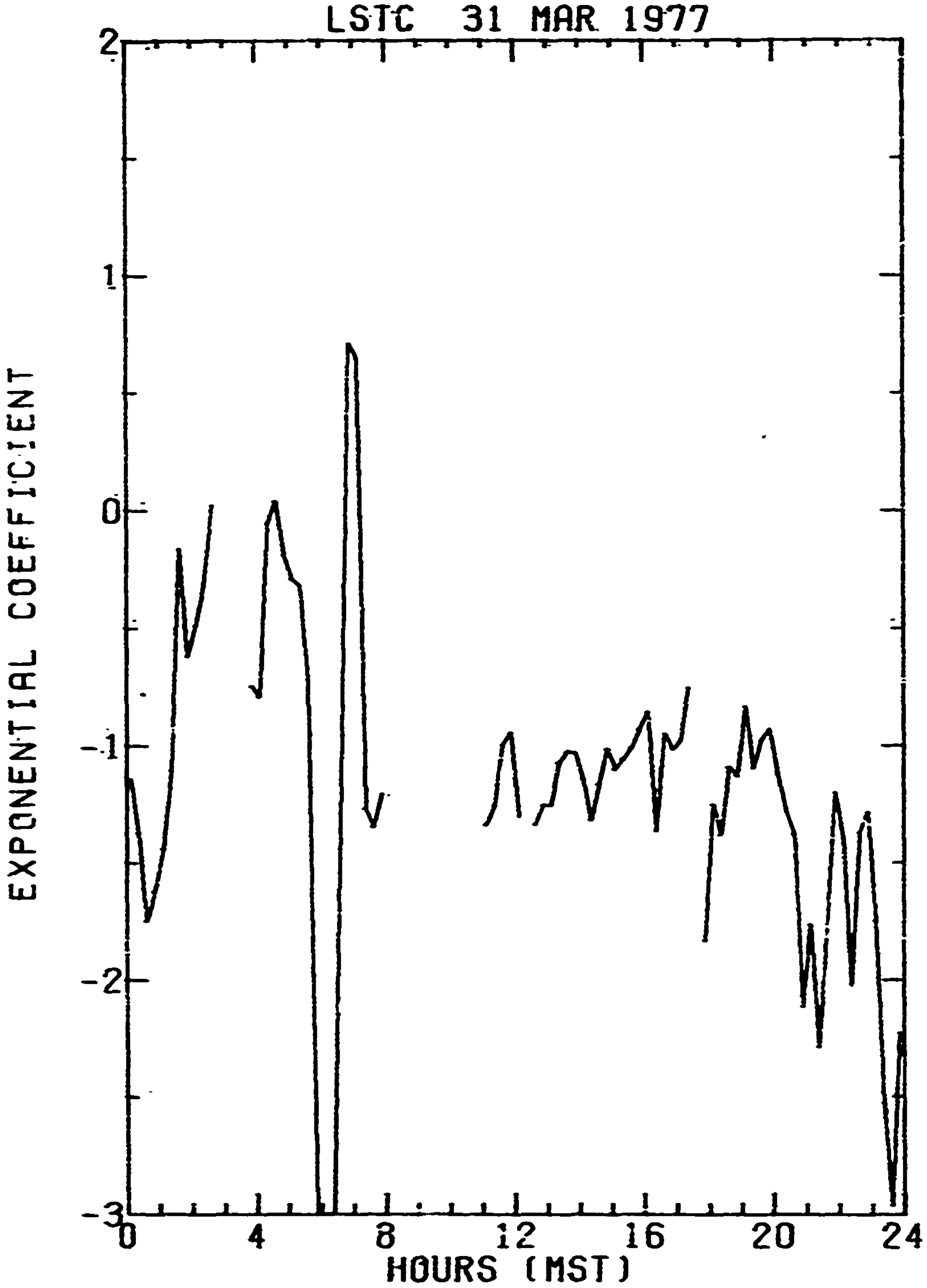


Figure 65. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 31 March 1977.

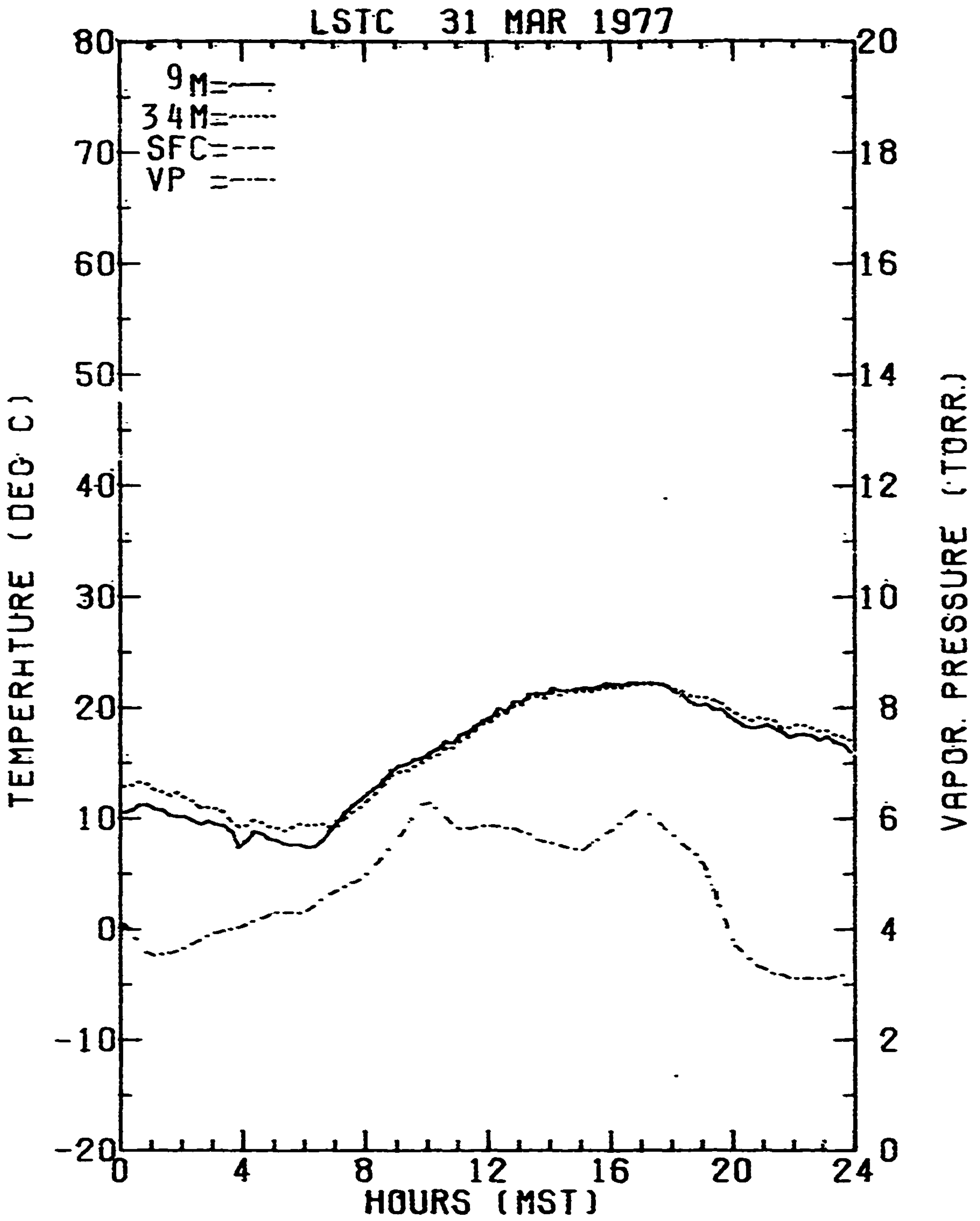


Figure 66. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 31 March 1977.

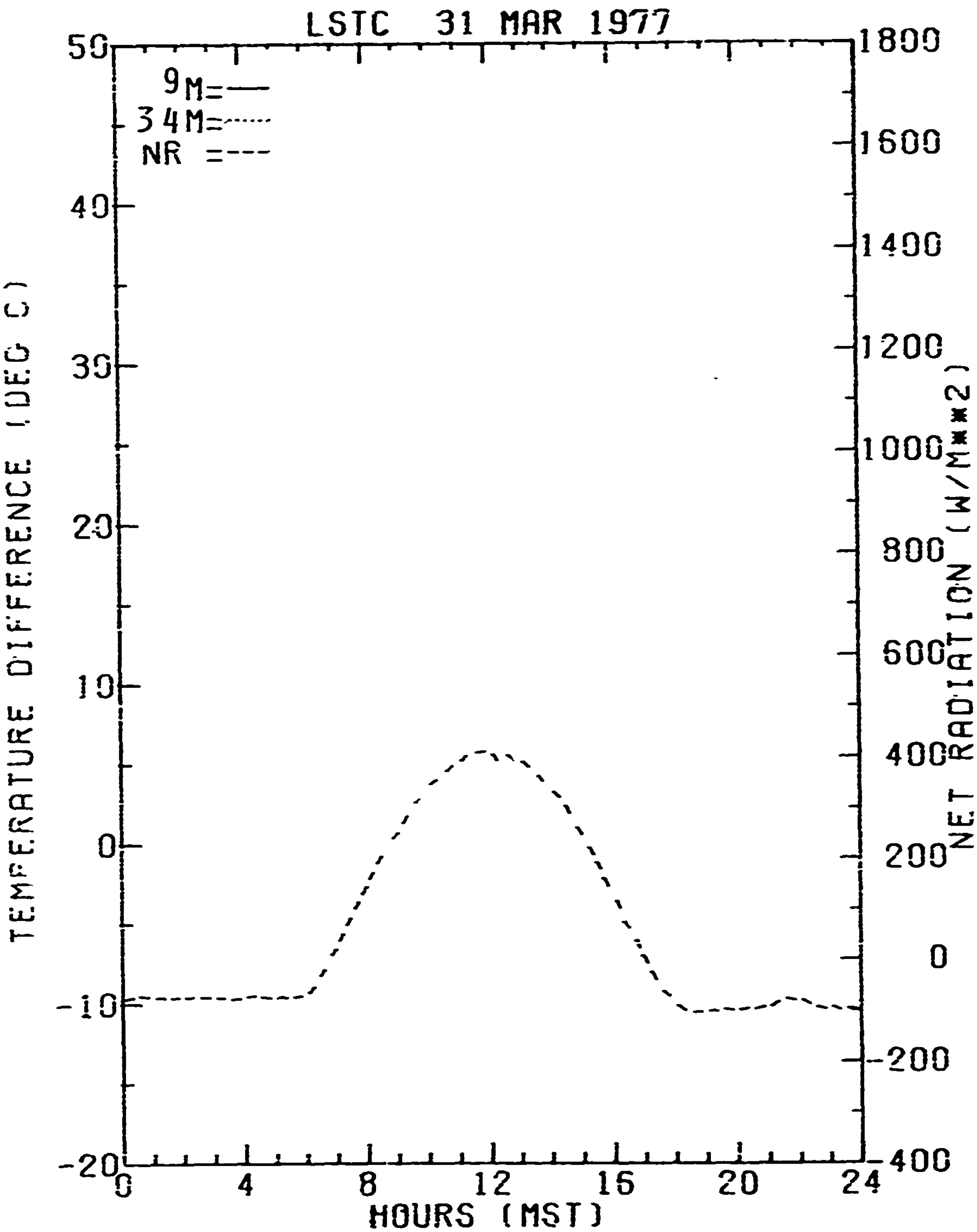


Figure 67. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 31 March 1977.

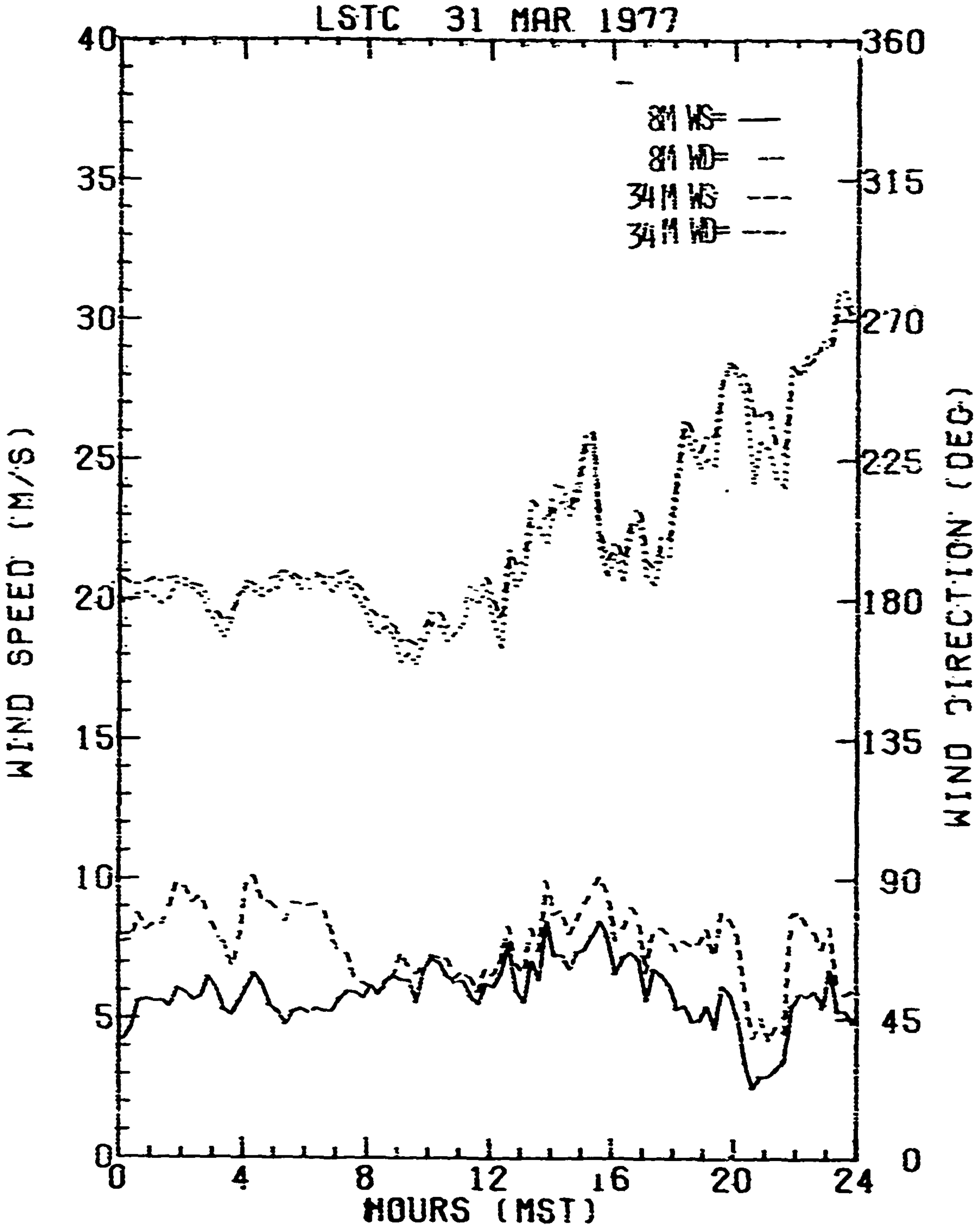


Figure 68. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 31 March 1977.

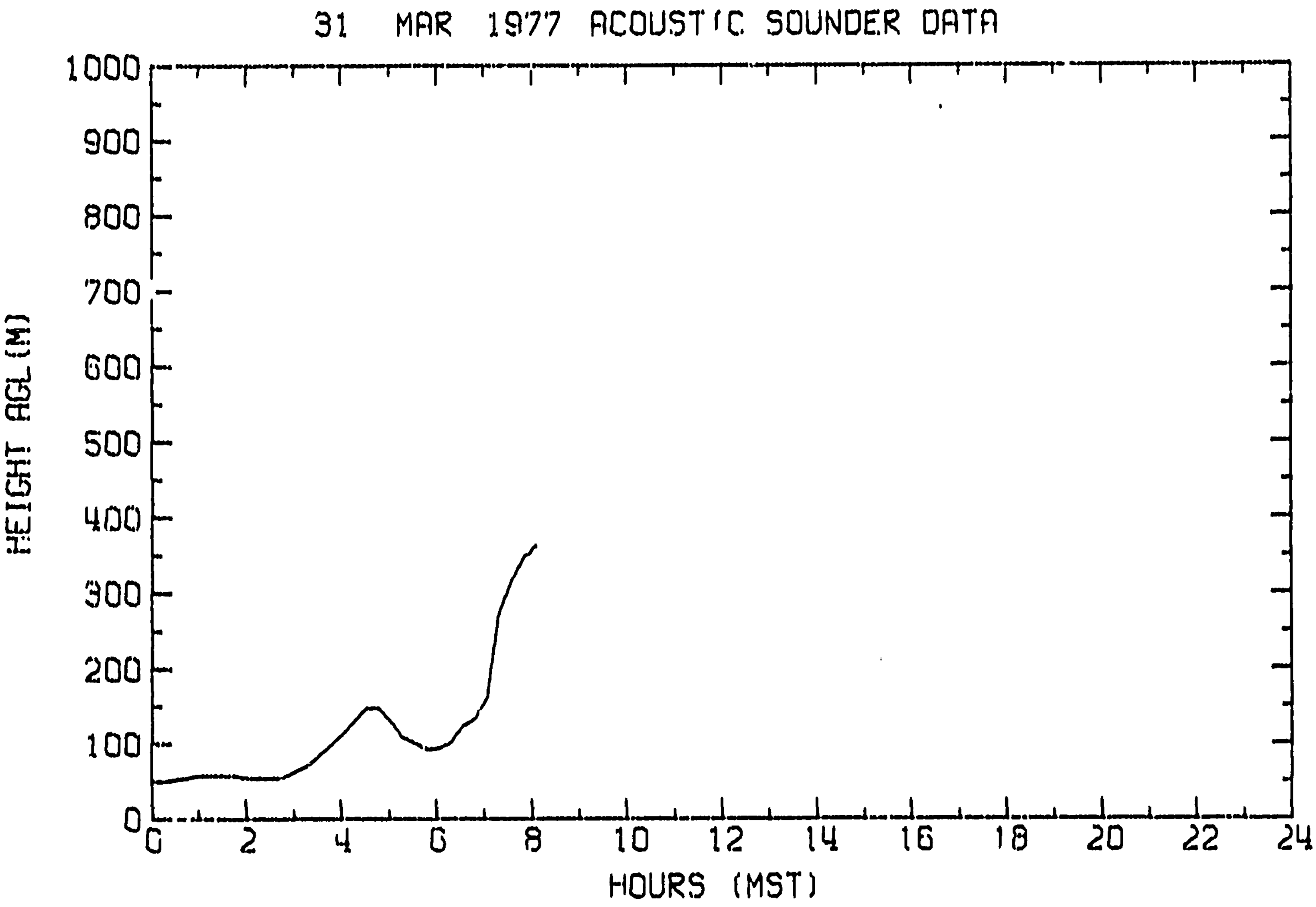


Figure 69. Inversion heights, LSTC, 31 March 1977.

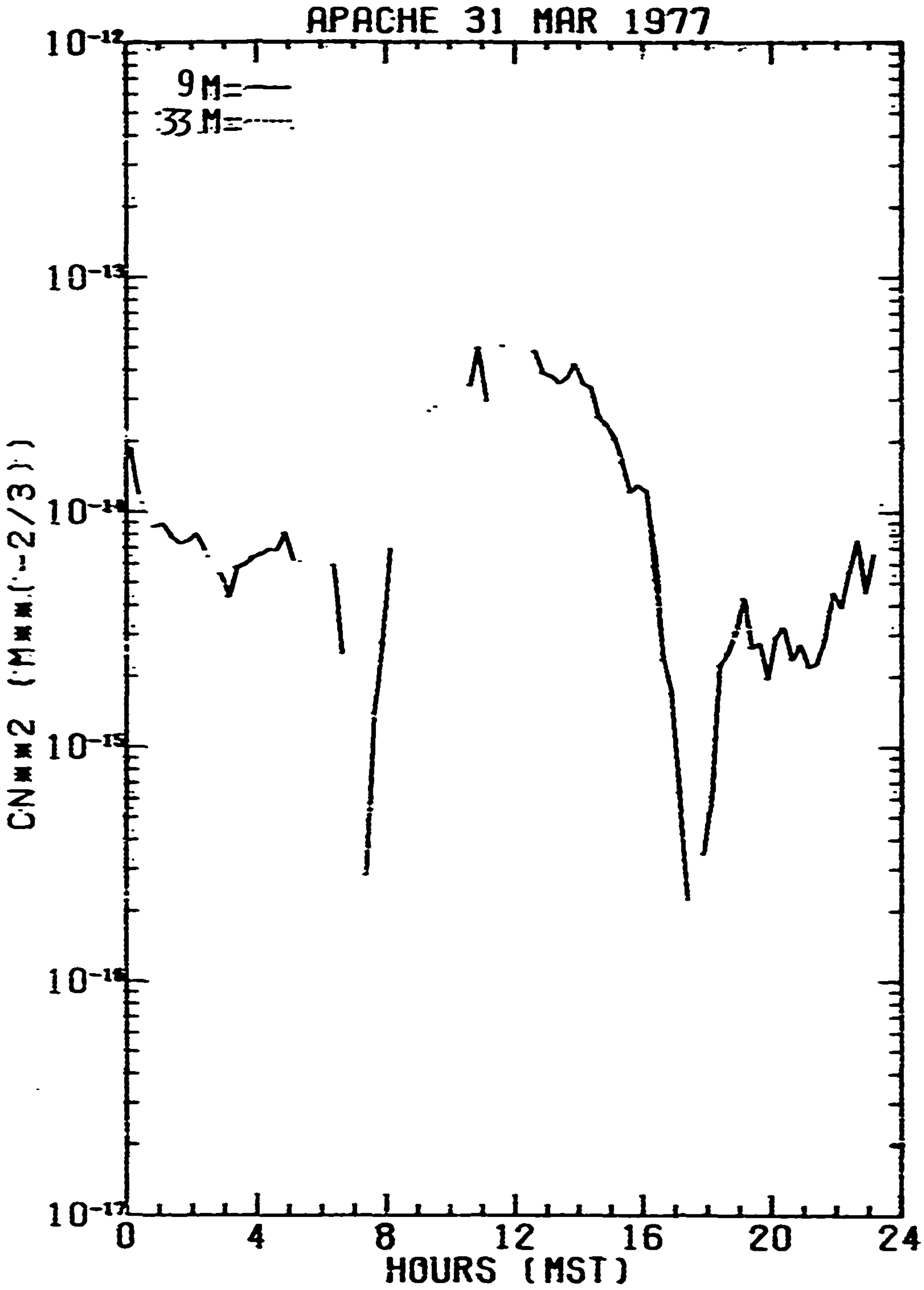


Figure 70. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 31 March 1977.

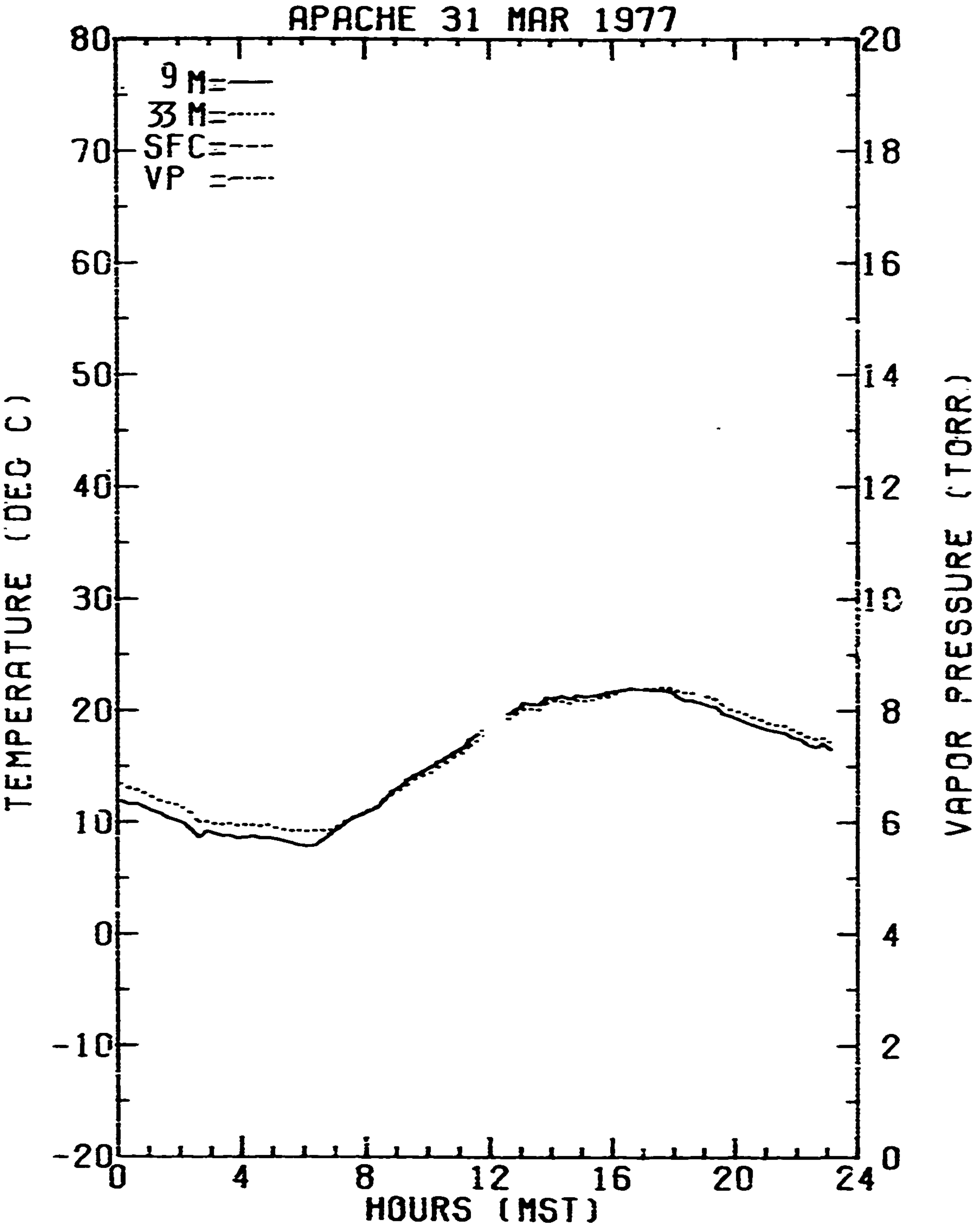


Figure 71. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 31 March 1977.

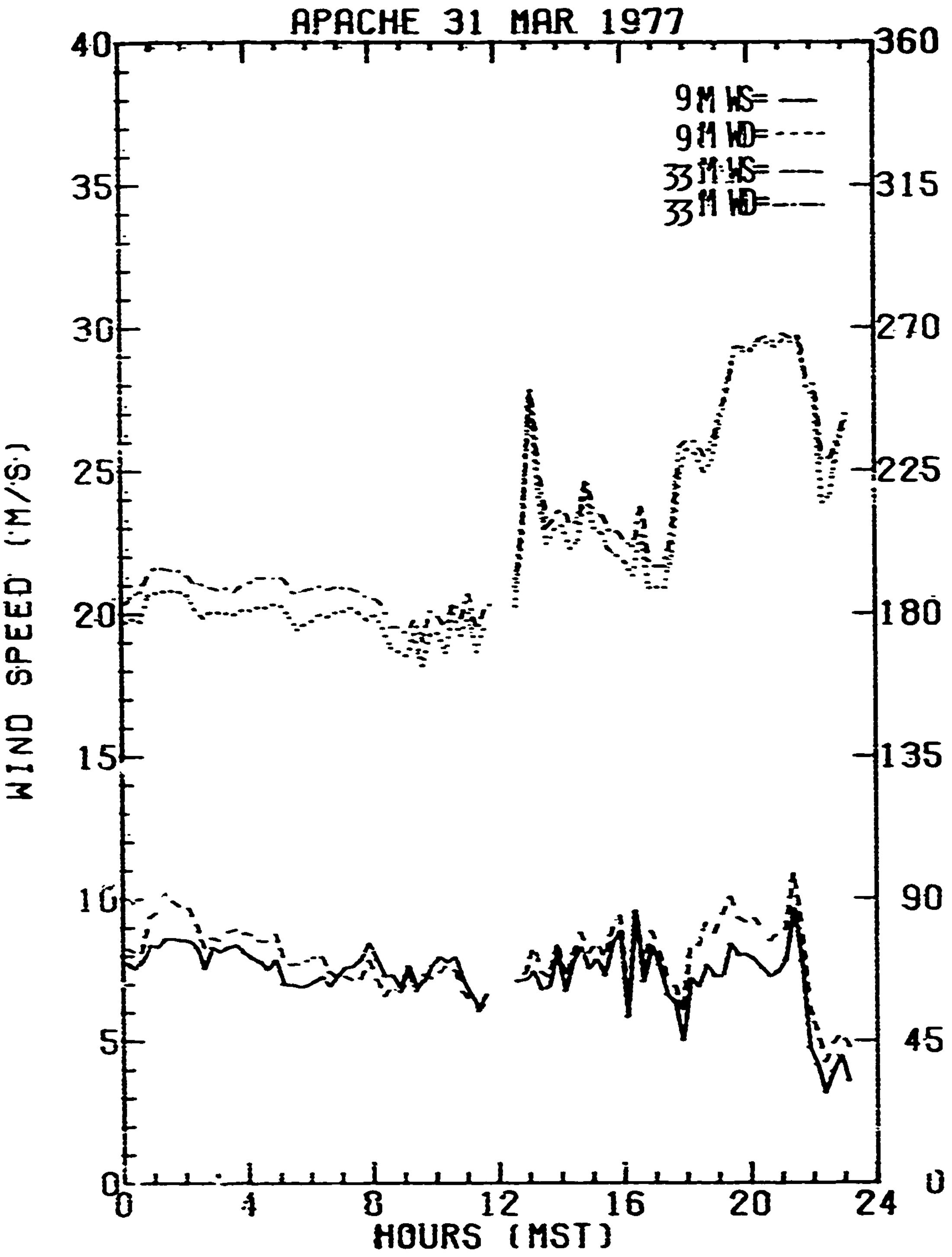


Figure 72. Dirunal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 31 March 1977.

TABLE 45
APACHE SITE RAWINSONDE DATA

DATE: 31 MAR 77 RELEASE NO.: 22 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	660.1	8.5	3.8	180.0	9.3
288.8	637.5	8.4	3.2	171.5	12.3
491.9	622.0	8.7	3.3	167.6	14.5
913.6	591.0	5.7	2.8	171.0	12.9
1152.5	574.0	6.9	2.4	186.7	10.6
1470.8	552.1	4.0	2.1	220.2	7.4
1879.5	525.0	1.6	1.8	215.1	6.4
2588.5	480.4	-3.4	1.2	204.5	13.7
3389.5	433.6	-10.6	0.8	208.4	17.8

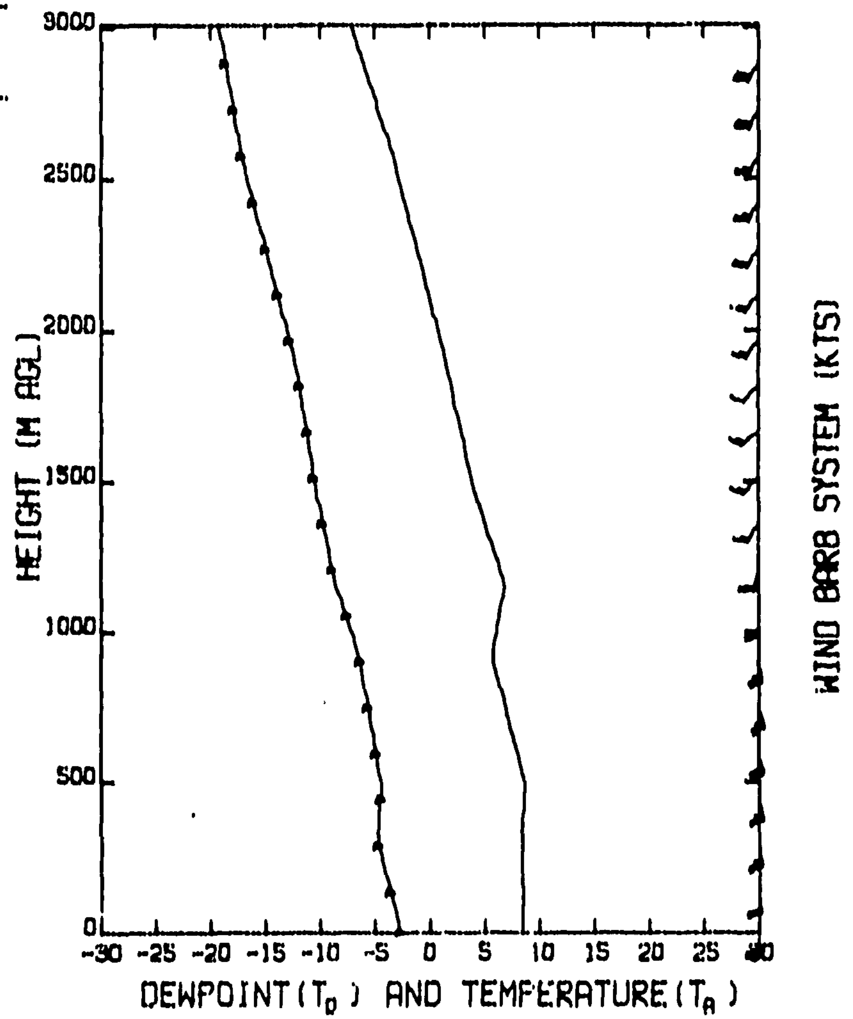


TABLE 46
APACHE SITE RAWINSONDE DATA

DATE: 31 MAR 77 RELEASE NO.: 23 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	658.5	20.2	4.1	150.0	10.3
142.0	647.7	18.0	3.7	154.0	10.1
277.5	637.5	16.7	3.7	158.6	9.8
1062.0	580.6	8.7	2.9	194.6	9.2
1885.0	525.0	1.2	1.8	237.1	11.2
2358.0	494.8	-2.9	1.4	240.7	13.1
2703.4	473.7	-4.9	0.9	237.1	16.9
3310.4	438.3	-9.1	0.6	229.7	17.4

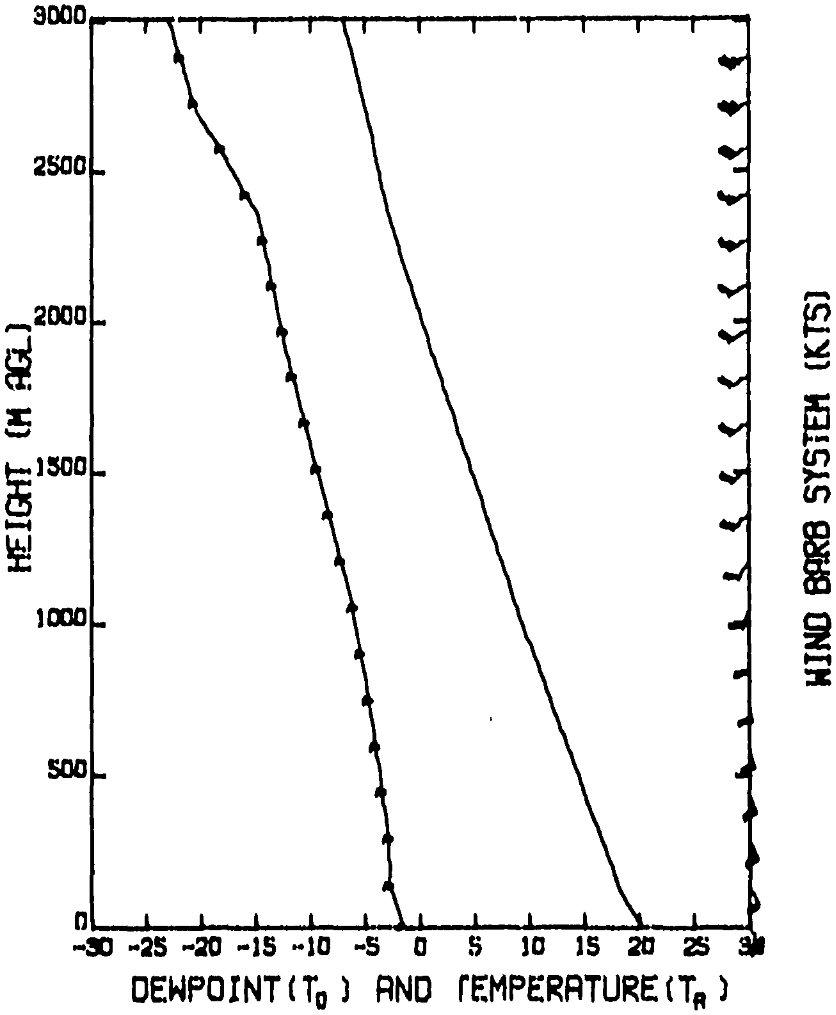


TABLE 47

APACHE SITE RAWINSONDE DATA

DATE: 31 MAR 77 RELEASE NO.: 24 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.0	21.0	4.5	240.0	6.2
232.5	637.5	17.9	3.2	232.2	7.8
789.4	597.0	13.5	2.3	223.6	11.0
1850.2	525.0	2.4	1.6	224.2	11.6
3523.0	424.5	-12.5	0.9	219.5	21.4

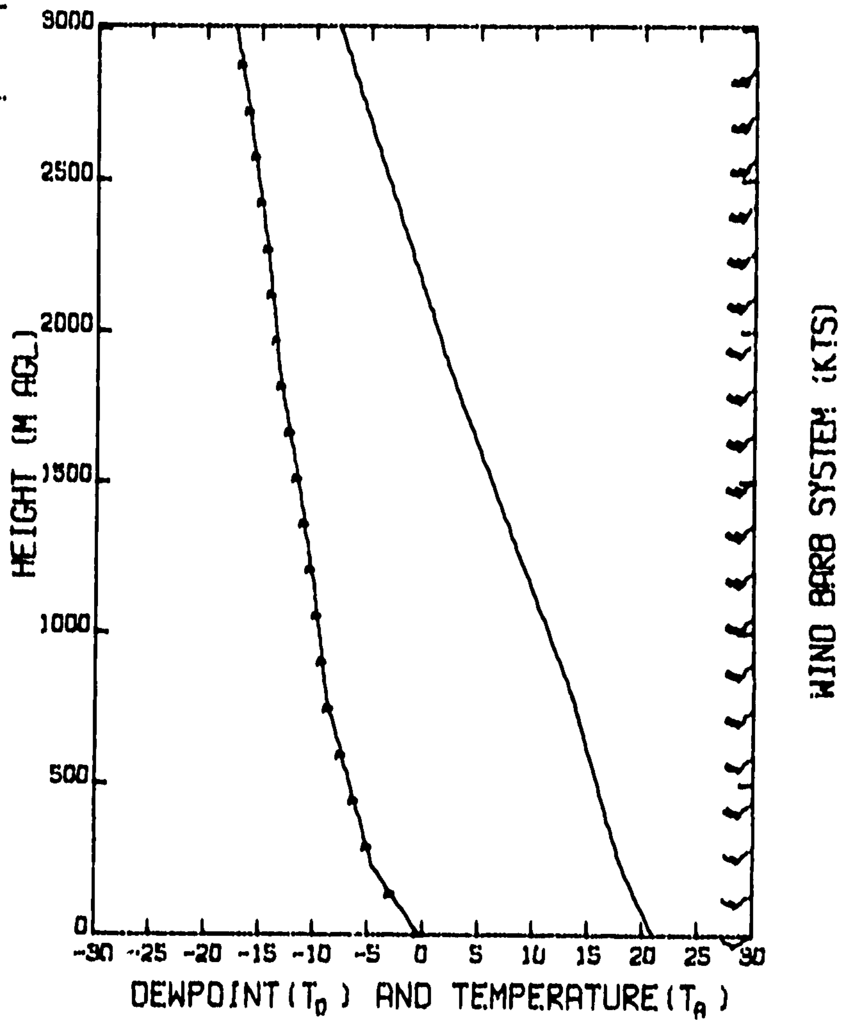
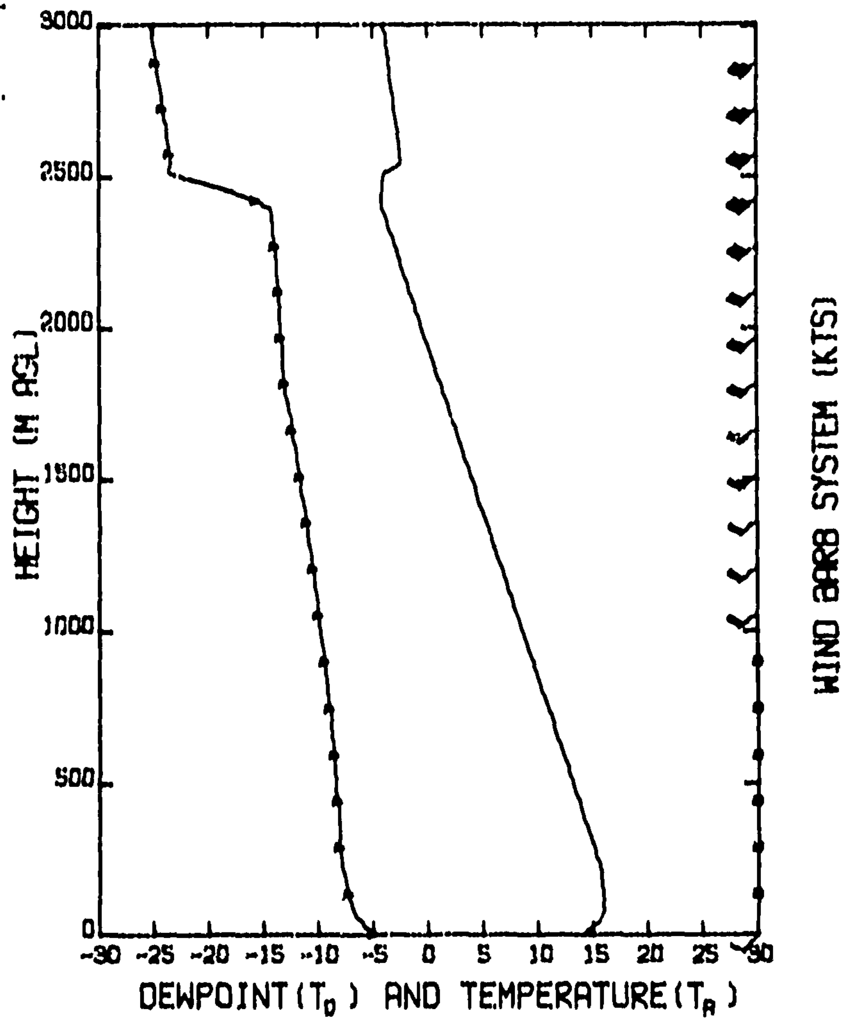


TABLE 48
APACHE SITE RAWINSONDE DATA

DATE: 31 MAR 77 RELEASE NO.: 25 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.9	14.1	3.1	220.0	4.1
62.2	651.1	16.2	2.9	0.0	0.0
242.0	637.5	15.5	2.5	0.0	0.0
1845.5	525.0	0.8	1.7	227.9	15.2
2402.1	489.6	-4.2	1.5	230.6	24.3
2511.7	482.8	-4.0	0.7	228.7	24.5
2545.1	480.8	-2.4	0.7	228.3	24.3
3098.8	448.3	-4.4	0.6	222.3	25.5



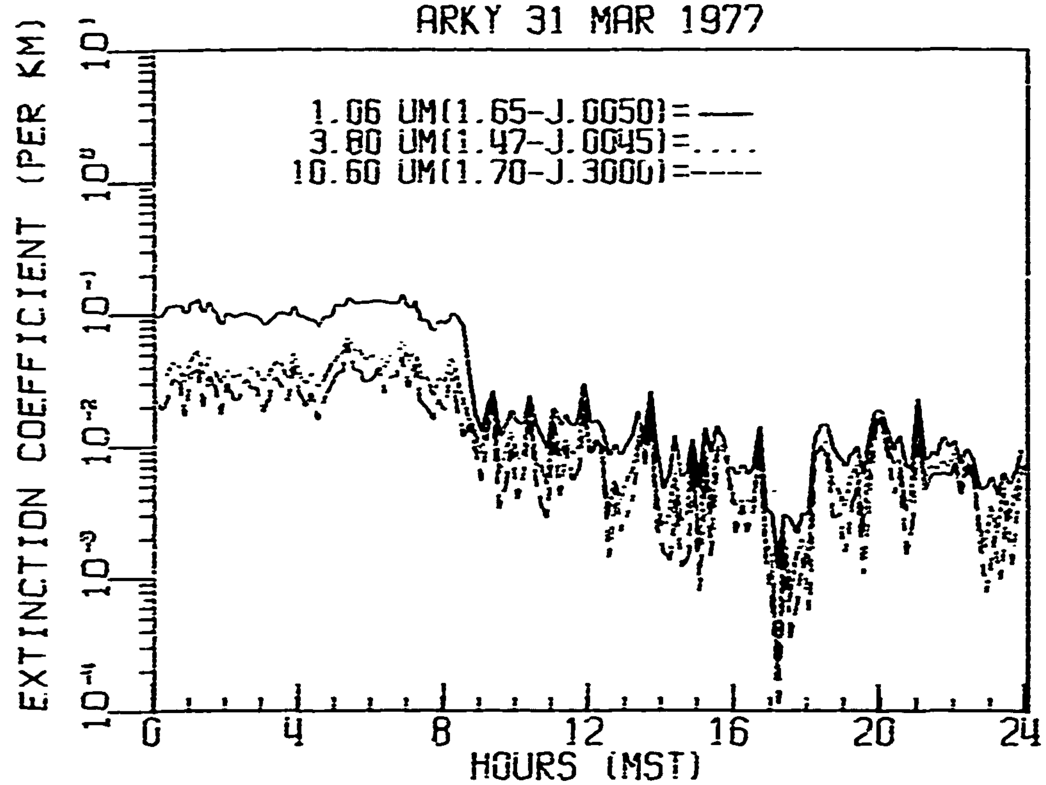


Figure 73. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 31 March 1977.

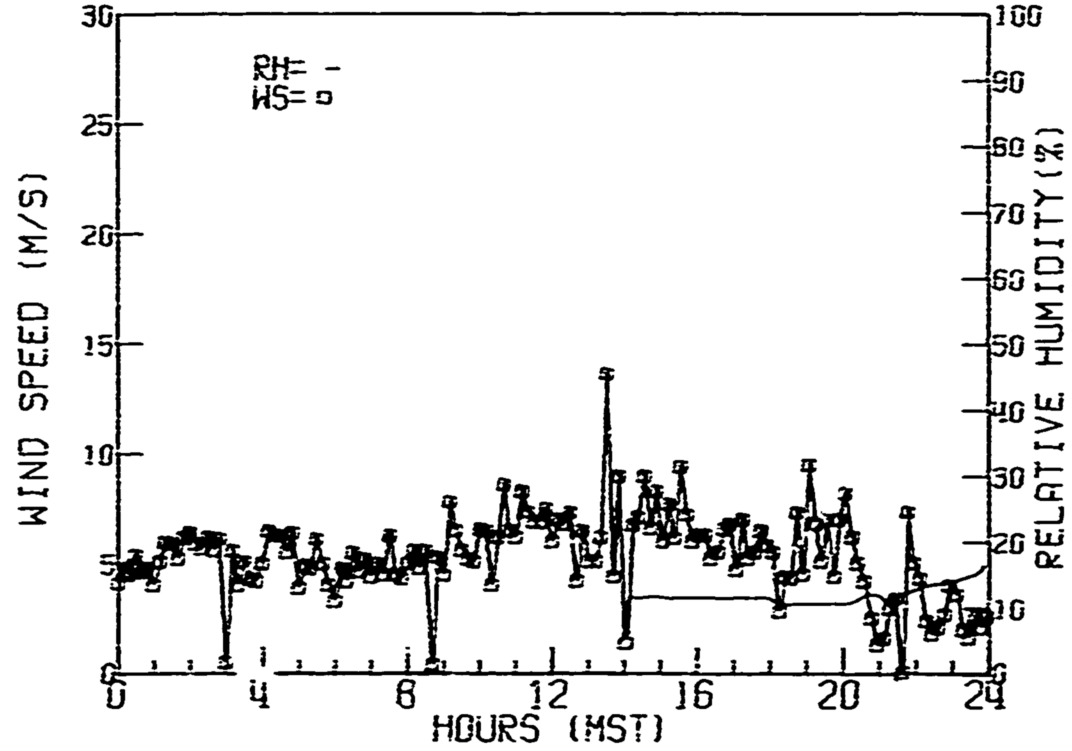


Figure 74. Diurnal variation of windspeed and relative humidity, Arky Site, 31 March 1977.

TABLE 49
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
31 MAR 77														
	0 : 0:00	600	.19+02	.20+01	.64+00	.12+00	.48-01	.00	.00	.00	.99-01	.33-01	.22-01	244.
	0 :10:00	500	.17+02	.26+01	.67+00	.33-01	.95-01	.00	.00	.00	.99-01	.33-01	.20-01	210.
	0 :20:00	600	.21+02	.28+01	.67+00	.91-01	.48-01	.00	.00	.00	.11+00	.35-01	.22-01	255.
	0 :30:00	500	.21+02	.27+01	.10+01	.30-01	.95-01	.30-01	.00	.00	.12+00	.44-01	.33-01	394.
	0 :40:00	600	.22+02	.23+01	.88+00	.91-01	.19+00	.00	.00	.00	.12+00	.40-01	.31-01	285.
	0 :50:00	500	.21+02	.27+01	.99+00	.46-01	.00	.00	.00	.00	.10+00	.31-01	.17-01	217.
	01:00:00	600	.21+02	.27+01	.73+00	.61-01	.48-01	.59-01	.00	.00	.12+00	.46-01	.36-01	476.
	01:10:00	500	.22+02	.33+01	.77+00	.15+00	.49-01	.30-01	.00	.00	.13+00	.54-01	.39-01	469.
	01:20:00	600	.20+02	.29+01	.61+00	.11+00	.00	.00	.00	.00	.11+00	.33-01	.20-01	246.
	01:30:00	500	.22+02	.30+01	.77+00	.17+00	.11+00	.00	.00	.00	.12+00	.48-01	.34-01	327.
	01:40:00	600	.18+02	.25+01	.76+00	.30-01	.48-01	.39-01	.00	.00	.10+00	.37-01	.27-01	358.
	01:50:00	500	.15+02	.22+01	.99+00	.71-01	.00	.00	.00	.00	.84-01	.31-01	.19-01	202.
	02:00:00	600	.18+02	.23+01	.61+00	.91-01	.14+00	.20-01	.00	.00	.10+00	.39-01	.31-01	322.
	02:10:00	500	.14+02	.24+01	.67+00	.91-01	.95-01	.00	.00	.00	.97-01	.34-01	.23-01	235.
	02:20:00	600	.18+02	.26+01	.85+00	.76-01	.96-01	.00	.00	.00	.99-01	.35-01	.23-01	234.
	02:30:00	500	.19+02	.22+01	.57+00	.12+00	.21+00	.00	.00	.00	.10+00	.40-01	.33-01	277.
	02:40:00	600	.17+02	.25+01	.85+00	.46-01	.48-01	.39-01	.00	.00	.99-01	.39-01	.29-01	359.
	02:50:00	500	.15+02	.25+01	.93+00	.71-01	.95-01	.20-01	.00	.00	.95-01	.37-01	.25-01	304.
	03:00:00	600	.19+02	.23+01	.82+00	.11+00	.00	.00	.00	.00	.85-01	.32-01	.19-01	209.
	03:10:00	500	.15+02	.24+01	.77+00	.15+00	.49-01	.00	.00	.00	.90-01	.37-01	.25-01	245.
	03:20:00	600	.16+02	.25+01	.85+00	.14+00	.14+00	.20-01	.00	.00	.10+00	.45-01	.35-01	343.
	03:30:00	500	.14+02	.27+01	.10+01	.76-01	.95-01	.20-01	.00	.00	.10+00	.47-01	.30-01	317.
	03:40:00	600	.18+02	.28+01	.70+00	.61-01	.96-01	.00	.00	.00	.99-01	.33-01	.22-01	225.
	03:50:00	500	.19+02	.29+01	.77+00	.11+00	.95-01	.57-01	.00	.00	.11+00	.32-01	.41-01	494.
	04:00:00	600	.18+02	.23+01	.73+00	.76-01	.48-01	.20-01	.00	.00	.98-01	.35-01	.25-01	296.
	04:10:00	500	.17+02	.24+01	.67+00	.19-01	.11+00	.00	.00	.00	.92-01	.30-01	.21-01	195.
	04:20:00	600	.15+02	.21+01	.97+00	.91-01	.14+00	.00	.00	.00	.90-01	.36-01	.26-01	231.
	04:30:00	500	.15+02	.25+01	.92+00	.61-01	.00	.00	.00	.00	.93-01	.29-01	.16-01	16[illegible]
	04:40:00	600	.17+02	.25+01	.64+00	.91-01	.96-01	.00	.00	.00	.96-01	.33-01	.23-01	233.
	04:50:00	500	.17+02	.23+01	.10+01	.11+00	.11+00	.00	.00	.00	.99-01	.40-01	.28-01	253.
	05:00:00	600	.20+02	.27+01	.76+00	.18+00	.48-01	.39-01	.00	.00	.12+00	.47-01	.36-01	432.
	05:10:00	500	.19+02	.28+01	.10+01	.91-01	.95-01	.30-01	.00	.00	.12+00	.52-01	.39-01	423.
	05:20:00	600	.19+02	.27+01	.88+00	.18+00	.14+00	.98-01	.00	.00	.13+00	.69-01	.60-01	713.
	05:30:00	500	.20+02	.37+01	.13+01	.11+00	.27+00	.00	.00	.00	.12+00	.54-01	.40-01	322.
	05:40:00	600	.20+02	.33+01	.13+01	.18+00	.14+00	.00	.00	.00	.12+00	.53-01	.37-01	335.
	05:50:00	500	.22+02	.33+01	.12+01	.36-01	.95-01	.20-01	.00	.00	.12+00	.45-01	.30-01	339.
	06:00:00	600	.22+02	.33+01	.14+01	.11+00	.14+00	.00	.00	.00	.13+00	.50-01	.33-01	310.
	06:10:00	500	.22+02	.23+01	.14+01	.76-01	.21+00	.20-01	.00	.00	.13+00	.51-01	.40-01	377.
	06:20:00	600	.23+02	.37+01	.79+00	.76-01	.96-01	.00	.00	.00	.12+00	.40-01	.26-01	279.
	06:30:00	500	.20+02	.30+01	.15+01	.11+00	.17+00	.00	.00	.00	.12+00	.49-01	.35-01	307.
	06:40:00	600	.20+02	.31+01	.11+01	.12+00	.96-01	.20-01	.00	.00	.12+00	.48-01	.34-01	366.

TABLE 49 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
31 MAR 77														
	06:50:00	600	.23+02	.32+01	.19+01	.14+00	.96-01	.59-01	.00	.00	.14+00	.64-01	.48-01	561.
	07:00:00	600	.19+02	.31+01	.12+01	.11+00	.00	.20-01	.00	.00	.11+00	.45-01	.29-01	336.
	07:10:00	600	.21+02	.29+01	.12+01	.15+00	.96-01	.39-01	.00	.00	.13+00	.56-01	.42-01	466.
	07:20:00	600	.17+02	.21+01	.58+00	.17+00	.00	.00	.00	.00	.92-01	.38-01	.23-01	247.
	07:30:00	600	.15+02	.24+01	.91+00	.11+00	.00	.00	.00	.00	.86-01	.33-01	.20-01	214.
	07:40:00	600	.14+02	.20+01	.52+00	.51-01	.49-01	.00	.00	.00	.76-01	.25-01	.16-01	175.
	07:50:00	600	.16+02	.20+01	.67+00	.14+00	.48-01	.00	.00	.00	.88-01	.33-01	.23-01	232.
	08:00:00	600	.16+02	.21+01	.76+00	.11+00	.00	.00	.00	.00	.86-01	.31-01	.19-01	211.
	08:10:00	600	.15+02	.21+01	.11+01	.12+00	.00	.59-01	.00	.00	.10+00	.49-01	.37-01	465.
	08:20:00	600	.19+02	.23+01	.79+00	.76-01	.95-01	.00	.00	.00	.96-01	.33-01	.23-01	227.
	08:30:00	600	.26+02	.26+01	.52+00	.15-01	.00	.00	.00	.00	.81-01	.23-01	.12-01	160.
	08:40:00	600	.47+01	.88+00	.27+00	.46-01	.11+00	.00	.00	.00	.35-01	.15-01	.15-01	102.
	08:50:00	600	.14+01	.71+00	.27+00	.30-01	.00	.20-01	.00	.00	.18-01	.13-01	.10-01	122.
	09:00:00	600	.15+01	.54+00	.24+00	.46-01	.00	.00	.00	.00	.13-01	.87-02	.55-02	45.
	09:10:00	600	.12+01	.75+00	.43+00	.61-01	.96-01	.00	.00	.00	.20-01	.16-01	.13-01	80.
	09:20:00	600	.14+01	.50+00	.37+00	.91-01	.11+00	.20-01	.00	.00	.27-01	.23-01	.22-01	194.
	09:30:00	600	.16+01	.60+00	.21+00	.15-01	.00	.00	.00	.00	.12-01	.63-02	.34-02	32.
	09:40:00	600	.15+01	.69+00	.33+00	.33-01	.00	.00	.00	.00	.15-01	.92-02	.51-02	44.
	09:50:00	600	.16+01	.88+00	.27+00	.61-01	.48-01	.00	.00	.00	.19-01	.13-01	.97-02	71.
	10:00:00	600	.17+01	.13+01	.21+00	.15-01	.00	.00	.00	.00	.15-01	.79-02	.40-02	39.
	10:10:00	600	15+01	.75+00	.27+00	.15-01	.48-01	.00	.00	.00	.15-01	.91-02	.64-02	43.
	10:20:00	600	.14+01	.58+00	.19+00	.76-01	.11+00	.20-01	.00	.00	.24-01	.20-01	.20-01	171.
	10:30:00	600	.16+01	.84+00	.12+00	.15-01	.48-01	.00	.00	.00	.15-01	.77-02	58-02	42.
	10:40:00	600	.13+01	.62+00	.27+00	.15-01	.00	.00	.00	.00	.12-01	.70-02	.36-02	31.
	10:50:00	600	.14+01	.30+00	.21+00	.15-01	.00	.00	.00	.00	.98-02	.52-02	.29-02	27.
	11:00:00	600	.14+01	.51+00	.15+00	.33-01	.00	.37-01	.00	.00	.22-01	.15-01	.14-01	197.
	11:10:00	600	.20+01	.54+00	.40+00	.15-01	.00	.00	.00	.00	.15-01	.83-02	.43-02	38.
	11:20:00	600	.15+01	.60+00	.21+00	.00	.49-01	.20-01	.00	.00	.17-01	.11-01	.10-01	112.
	11:30:00	600	.16+01	.64+00	.21+00	.46-01	.00	.00	.00	.00	.14-01	.88-02	.55-02	50.
	11:40:00	600	.17+01	.71+00	.37+00	.15-01	.49-01	.00	.00	.00	.16-01	.10-01	.59-02	47.
	11:50:00	600	.23+01	.15+01	.33+00	.76-01	.48-01	.20-01	.00	.00	.30-01	.22-01	.17-01	176.
	12:00:00	600	.15+01	.56+00	.91-01	.33-01	.95-01	.00	.00	.00	.15-01	.91-02	.49-02	55.
	12:10:00	600	.13+01	.45+00	.15+00	.15-01	.48-01	.20-01	.00	.00	.16-01	.11-01	.11-01	116.
	12:20:00	600	.11+01	.43+00	.33-01	.15-01	.49-01	.20-01	.00	.00	.14-01	.97-02	.79-02	111.
	12:30:00	600	.14+01	.43+00	.91-01	.00	.00	.00	.00	.00	.86-02	.31-02	.15-02	17.
	12:40:00	600	.13+01	.24+00	.12+00	.15-01	.49-01	.00	.00	.00	.10-01	.55-02	.49-02	32.
	12:50:00	600	.12+01	.54+00	.30-01	.15-01	.00	.00	.00	.00	.88-02	.39-02	.23-02	24.
	13:00:00	600	.14+01	.41+00	.21+00	.15-01	.00	.00	.00	.00	.10-01	.55-02	.31-02	29.
	13:10:00	600	.17+01	.54+00	.15+00	.30-01	.00	.00	.00	.00	.13-01	.66-02	.41-02	39.
	13:20:00	600	.17+01	.49+00	.12+00	.00	.95-01	.20-01	.0	.00	.18-01	.12-01	.12-01	119.
	13:30:00	600	.94+00	.15+00	.15+00	.15-01	.00	.20-01	0	.00	.11-01	.84-02	.75-02	101.

TABLE 49 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
31 MAR 77													
13:40:00	600	.26+01	.56+00	.15+00	.30-01	.48-01	.39-01	.00	.00	.26-01	.18-01	.17-01	215.
13:50:00	600	.15+01	.34+00	2+00	.15-01	.00	.00	.00	.00	.97-02	.44-02	.26-02	25.
14:00:00	600	.75+00	.15+00	.30-01	.15-01	.00	.00	.00	.00	.48-02	.23-02	.16-02	16.
14:10:00	600	.85+00	.28+00	.15+00	.00	.00	.00	.00	.00	.61-02	.30-02	.14-02	13.
14:20:00	600	.16+01	.58+00	.12+00	.30-01	.00	.00	.00	.00	.12-01	.64-02	.40-02	38.
14:30:00	600	.84+00	.33+00	.12+00	.00	.00	.00	.00	.00	.50-02	.28-02	.13-02	12.
14:40:00	600	.91+00	.32+00	.15+00	.00	.00	.00	.00	.00	.66-02	.32-02	.19-02	14.
14:50:00	600	.81+00	.39+00	.30-01	.30-01	.00	.20-01	.00	.00	.11-01	.90-02	.53-02	109.
15:00:00	600	.85+00	.19+00	.61-01	.00	.00	.00	.00	.00	.49-02	.17-02	.82-03	10.
15:10:00	600	.14+01	.51+00	.15+00	.46-01	.49-01	.00	.00	.00	.14-01	.92-02	.75-02	54.
15:20:00	600	.15+01	.45+00	.91-01	.00	.00	.00	.00	.00	.91-02	.32-02	.15-02	18.
15:30:00	600	.11+01	.41+00	.14+00	.00	.49-01	.20-01	.00	.00	.14-01	.10-01	.76-02	106.
15:40:00	600	.66+00	.19+00	.91-01	.46-01	.00	.20-01	.00	.00	.11-01	.10-01	.93-02	115.
15:50:00	600	.44+00	.19+00	.30-01	.00	.00	.20-01	.00	.00	.73-02	.58-02	.59-02	97
16:00:00	600	.78+00	.24+00	.12+00	.15-01	.00	.00	.00	.00	.62-02	.37-02	.22-02	20.
16:10:00	600	.74+00	.29+00	.91-01	.00	.49-01	.00	.00	.00	.70-02	.39-02	.36-02	20.
16:20:00	600	.74+00	.30+00	.12+00	.15-01	.00	.00	.00	.00	.64-02	.39-02	.23-02	20.
16:30:00	600	.77+00	.26+00	.91-01	.00	.49-01	.00	.00	.00	.70-02	.38-02	.34-02	29.
16:40:00	600	.11+01	.15+00	.61-01	.15-01	.96-01	.20-01	.00	.00	.14-01	.11-01	.12-01	117.
16:50:00	600	.50+00	.60-01	.30-01	.15-01	.00	.00	.00	.00	.34-02	.19-02	.14-02	13.
17:00:00	600	.45+00	.86-01	.91-01	.00	.00	.00	.00	.00	.30-02	.15-02	.70-03	6.
17:10:00	600	.29+00	.21-01	.00	.00	.00	.00	.00	.00	.12-02	.19-03	.11-03	2.
17:20:00	600	.32+00	.86-01	.61-01	.15-01	.00	.00	.00	.00	.31-02	.23-02	.15-02	13.
17:30:00	600	.50+00	.15+00	.00	.00	.00	.00	.00	.00	.29-02	.73-03	.36-03	5.
17:40:00	600	.23+00	.11+00	.91-01	.00	.00	.00	.00	.00	.22-02	.15-02	.66-03	5.
17:50:00	600	.35+00	.11+00	.30-01	.15-01	.00	.00	.00	.00	.31-02	.20-02	.14-02	13.
18:00:00	600	.44+00	.21+00	.30-01	.00	.00	.00	.00	.00	.32-02	.13-02	.58-03	6.
18:10:00	600	.92+00	.32+00	.00	.46-01	.95-01	.00	.00	.00	.12-01	.82-02	.59-02	54.
18:20:00	600	.12+01	.30+00	.21+00	.00	.48-01	.20-01	.00	.00	.14-01	.10-01	.96-02	106.
18:30:00	600	.15+01	.43+00	.37+00	.46-01	.49-01	.00	.00	.00	.15-01	.11-01	.94-02	57.
18:40:00	600	.13+01	.43+00	.18+00	.15-01	.00	.00	.00	.00	.98-02	.53-02	.29-02	27.
18:50:00	600	.11+01	.34+00	.51-01	.30-01	.00	.00	.00	.00	.84-02	.47-02	.32-02	30.
19:00:00	600	.93+00	.41+00	.15+00	.00	.00	.00	.00	.00	.72-02	.35-02	.16-02	15.
19:10:00	600	.97+00	.34+00	.14+00	.30-01	.00	.00	.00	.00	.90-02	.50-02	.37-02	32.
19:20:00	600	.11+01	.19+00	.24+00	.46-01	.00	.00	.00	.00	.10-01	.74-02	.49-02	41.
19:30:00	600	.95+00	.35+00	.51-01	.00	.00	.00	.00	.00	.65-02	.24-02	.11-02	13.
19:40:00	600	.13+01	.47+00	.18+00	.46-01	.00	.00	.00	.00	.12-01	.77-02	.50-02	44.
19:50:00	600	.13+01	.54+00	.14+00	.30-01	.00	.39-01	.00	.00	.19-01	.16-01	.15-01	196.
20:00:00	600	.85+00	.39+00	.15+00	.30-01	.48-01	.39-01	.00	.00	.19-01	.17-01	.17-01	201.
20:10:00	600	.13+01	.29+00	.15+00	.30-01	.00	.20-01	.00	.00	.13-01	.10-01	.90-02	111.
20:20:00	600	.78+00	.41+00	.30+00	.30-01	.00	.00	.00	.00	.95-02	.75-02	.54-02	34.

TABLE 49 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
31 MAR 77														
	20:30:00	600	.11+01	.56+00	.15+00	.30-01	.40-01	.00	.00	.00	.12-01	.80-02	.65-02	44.
	20:40:00	600	.96+00	.35+00	.15+00	.00	.00	.00	.00	.00	.71-02	.31-02	.15-02	15.
	20:50:00	600	.69+00	.32+00	.10+00	.15-01	.00	.00	.00	.00	.69-02	.46-02	.26-02	21.
	21:00:00	600	.15+01	.75+00	.47+00	.91-01	.95-01	.00	.00	.00	.23-01	.19-01	.15-01	101.
	21:10:00	600	.79+00	.21+00	.15+00	.15-01	.48-01	.00	.00	.00	.80-02	.55-02	.48-02	29.
	21:20:00	600	.61+00	.28+00	.19+00	.30-01	.45-01	.00	.00	.00	.73-02	.72-02	.51-02	35.
	21:30:00	600	.67+00	.17+00	.12+00	.00	.00	.26-01	.00	.00	.88-02	.69-02	.63-02	90.
	21:40:00	600	.12+01	.39+00	.19+00	.30-01	.44-01	.00	.00	.00	.12-01	.75-02	.58-02	43.
	21:50:00	600	.10+01	.30+00	.15+00	.30-01	.40-01	.00	.00	.00	.10-01	.71-02	.61-02	40.
	22:00:00	600	.85+00	.29+00	.29+00	.46-01	.45-01	.00	.00	.00	.11-01	.93-02	.74-02	49.
	22:10:00	600	.74+00	.28+00	.61-01	.15-01	.48-01	.00	.00	.00	.76-02	.47-02	.45-02	28.
	22:20:00	600	.75+00	.17+00	.91-01	.15-01	.00	.23-01	.00	.00	.97-02	.77-02	.72-02	99.
	22:30:00	600	.61+00	.24+00	.30-01	.76-01	.00	.00	.00	.00	.82-02	.73-02	.59-02	50.
	22:40:00	6[illegible]	.75+00	.13+00	.61-01	.15-01	.00	.00	.00	.00	.53-02	.25-02	.17-02	17.
	22:50:00	600	.76+00	.30+00	.30-01	.00	.00	.00	.00	.00	.49-02	.17-02	.80-03	10.
	23:00:00	600	.64+00	.32+00	.91-01	.15-01	.00	.00	.00	.00	.59-02	.35-02	.21-02	19.
	23:10:00	600	.62+00	.17+00	.12+00	.00	.00	.00	.00	.00	.44-02	.22-02	.10-02	9.
	23:20:00	600	.55+00	.21+00	.15+00	.30-01	.00	.00	.00	.00	.63-02	.53-02	.33-02	27.
	23:30:00	600	.66+00	.26+00	.15+00	.00	.00	.00	.00	.00	.53-02	.29-02	.13-02	11.
	23:40:00	600	.49+00	.25+00	.91-01	.15-01	.49-01	.00	.00	.00	.67-02	.47-02	.45-02	26.
	23:50:00	600	.73+00	.17+00	.61-01	.15-01	.00	.20-01	.00	.00	.93-02	.74-02	.70-02	97.

Weather Summary

Date: 1 April 1977

Synoptic

Surface: Surface low-pressure area over Colorado with trough extending south-southwest into Mexico and moving across WSMR shortly after noon.

500 Millibar: Upper air trough over western Arizona with strong southwesterly flow over New Mexico.

Holloman AFB

Clouds: Scattered low (cumulus), middle (altocumulus), and high (cirrus) clouds at 1800 m, 3600 m, and 7600 m AGL, respectively.

Wind: Southwesterly 3-5 m sec^{-1} increasing to 8-10 m sec^{-1} by 1000 MST. Peak gust of 19 m sec^{-1} from the west-southwest during late morning.

Visibility: Generally 50-60 km during morning decreasing to 1.5 km by midafternoon in blowing dust and blowing sand.

Maximum temperature: 17.2°C Corresponding vapor pressure: 4.6 Torr

Minimum temperature: 10.6°C Corresponding vapor pressure: 3.2 Torr

Figure 75a. Surface weather map for 1 April 1977.

Figure 75c. 500-millibar height contours for 1 April 1977.

TABLE 50. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 1 April 1977 Remarks
0100	14.0	3.7	-3.7	0	0	0	
0200	10.8	3.1	-5.3	0	0	0	32 m "ΔT" back on line at 0230
0300	8.9	3.5	-3.6	0	10 As	0	
0400	11.6	3.2	-4.9	0	10 As	10 As	
0500	12.0	6.3	5.5	0	10 As	10 Cs	
0600	11.5	5.4	2.4	0	20 As	20 Cs	
0700	12.3	7.0	6.1	10 Cu 10 Sc 10 St	0	20 Cs 10 Ci	
0800	15.0	5.3	2.1	20 Cu 20 Sc	10 As	20 Cs 20 Ci	
0900	14.4	5.2	1.8	50 Cu	10 Ac	30 Ci	
1000	14.6	5.8	3.3	50 Cu	0	20 Ci	
1100	15.1	4.1	-1.5	20 Cu	0	20 Ci	
1200	15.3	4.9	.9	20 Cu	0	20 Ci	Checked Apache - tape changed 1145-1213-bal both T/C's and 8 m ΔT
1300	15.8	3.1	-5.1	20 Cu	0	10 Ci	
1400	15.5	2.6	-7.5	10 Cu	0	10 Ci	
1500	16.2	2.5	-8.1	10 Cu	0	0	
1600	15.3	2.2	-9.9	0	0	0	8 m ΔT out
1700	14.4	2.0	-10.7	0	0	0	1616-8 m .T back on line (replaced probe)
1800	12.9	2.0	-10.9	0	0	0	Checked Apache - both ΔT's rdg negative aircraft observed
1900	12.0	2.6	-7.7	0	0	0	
2000	10.3	3.0	-5.8	0	0	0	
2100	9.7	1.9	-11.5	0	0	0	
2200	8.8	2.1	-10.1	0	0	0	
2300	7.3	2.1	-10.0	0	0	0	
2400	8.0	2.6	-7.3	0	0	0	Aircraft observed 2330

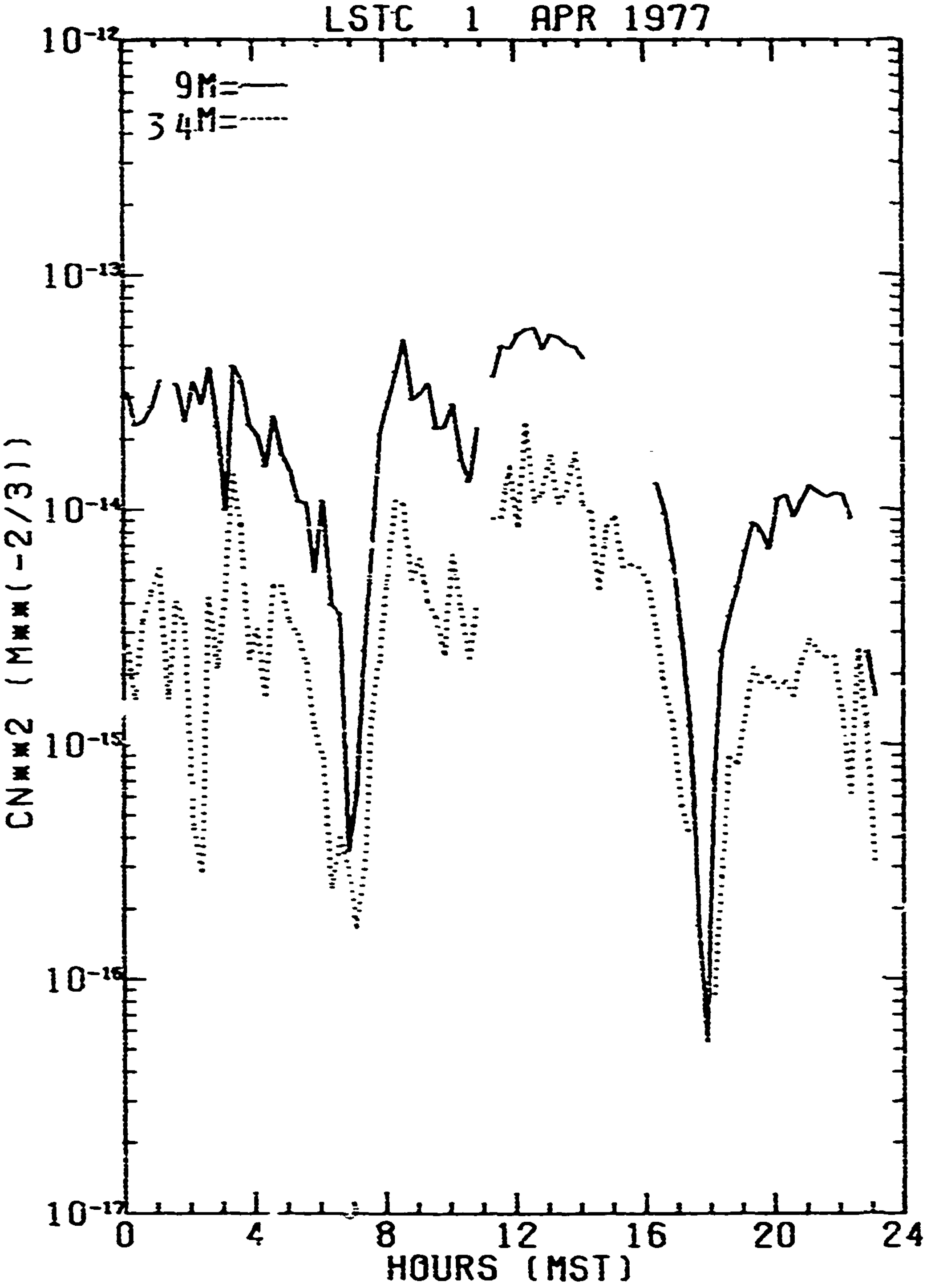


Figure 76. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 1 April 1977.

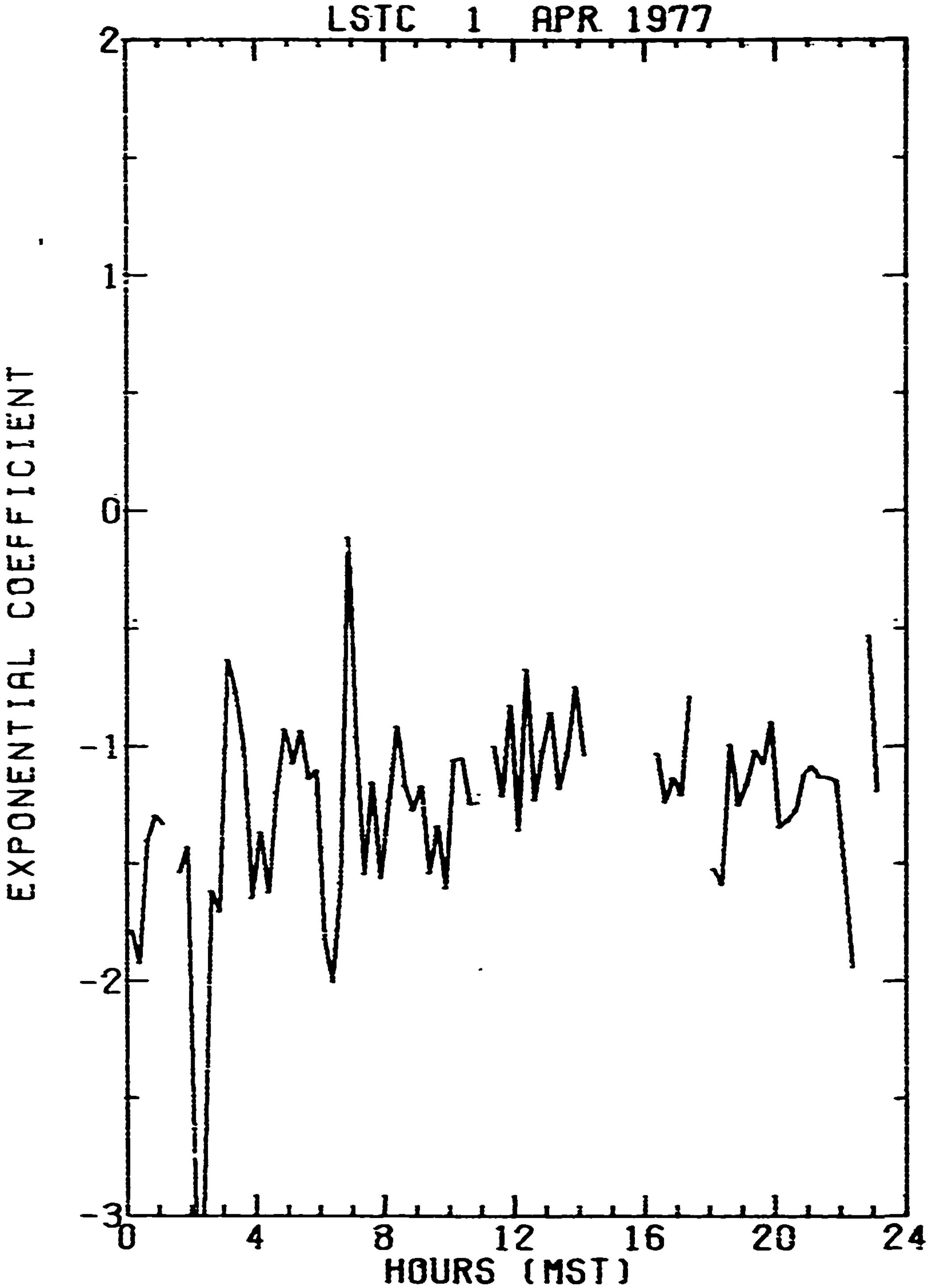


Figure 77. Diurnal variation of the altitude ange of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 1 April 1977.

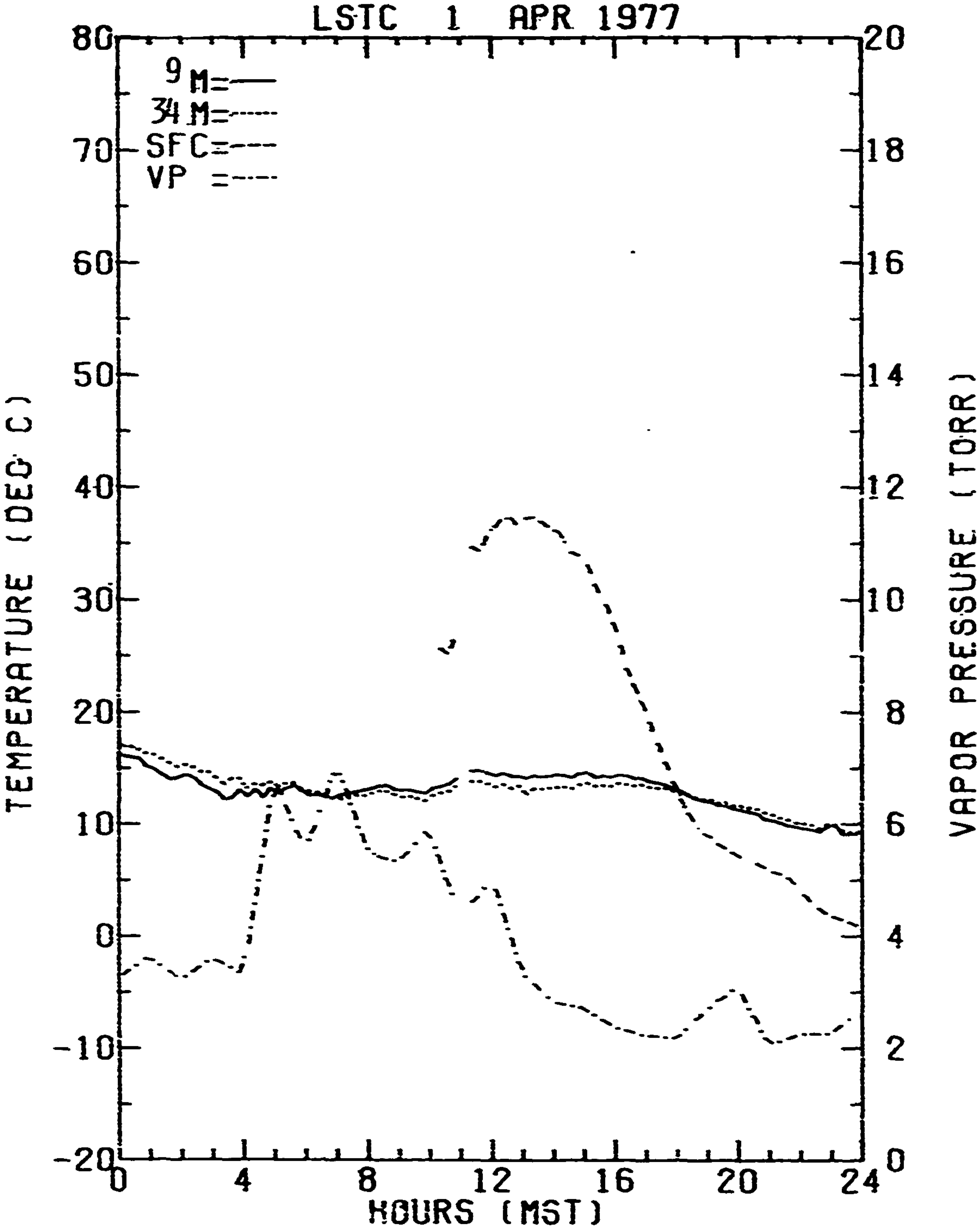


Figure 78. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 tower levels, and vapor pressure at 2 m level, LSTC, 1 April 1977.

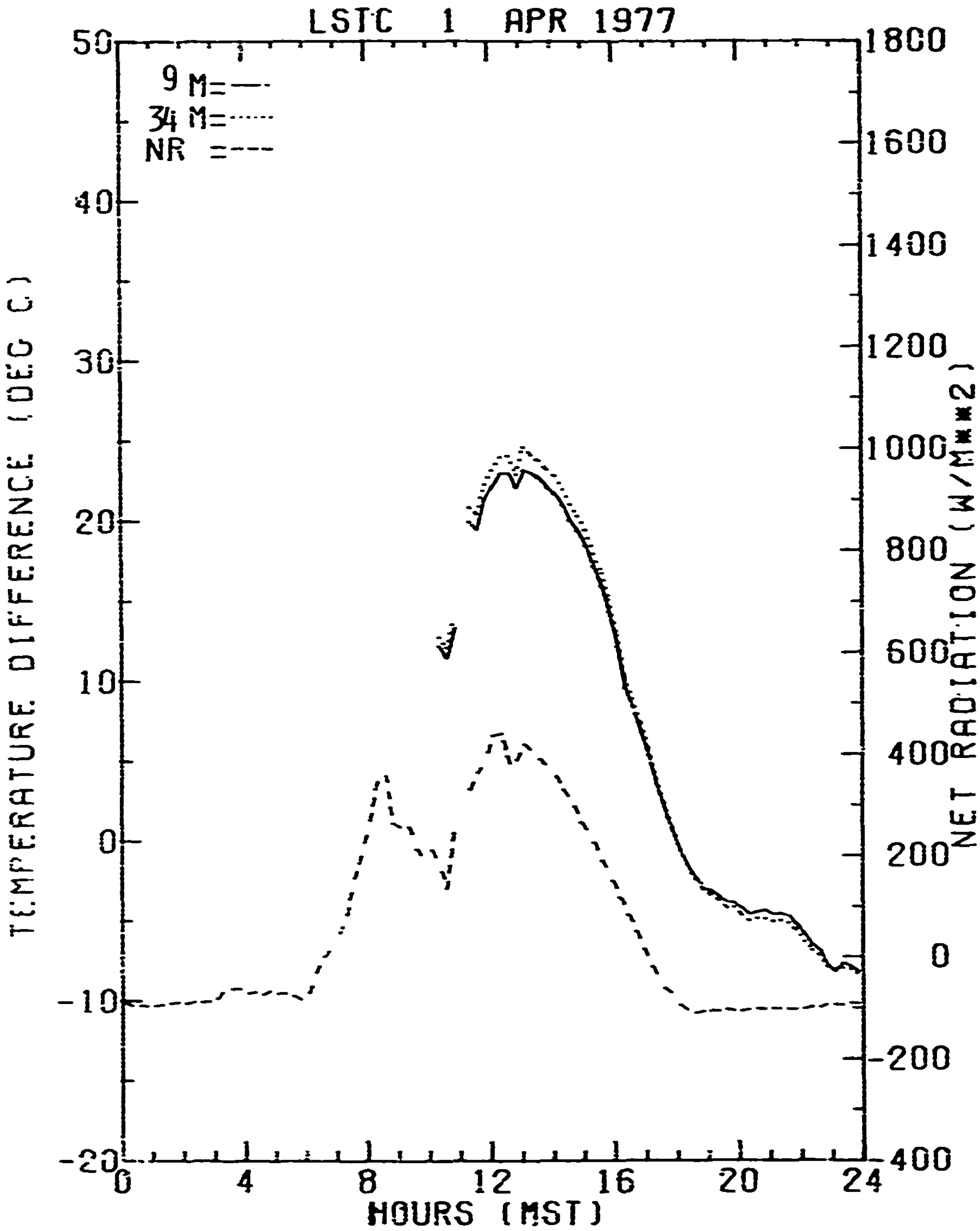


Figure 79. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 1 April 1977.

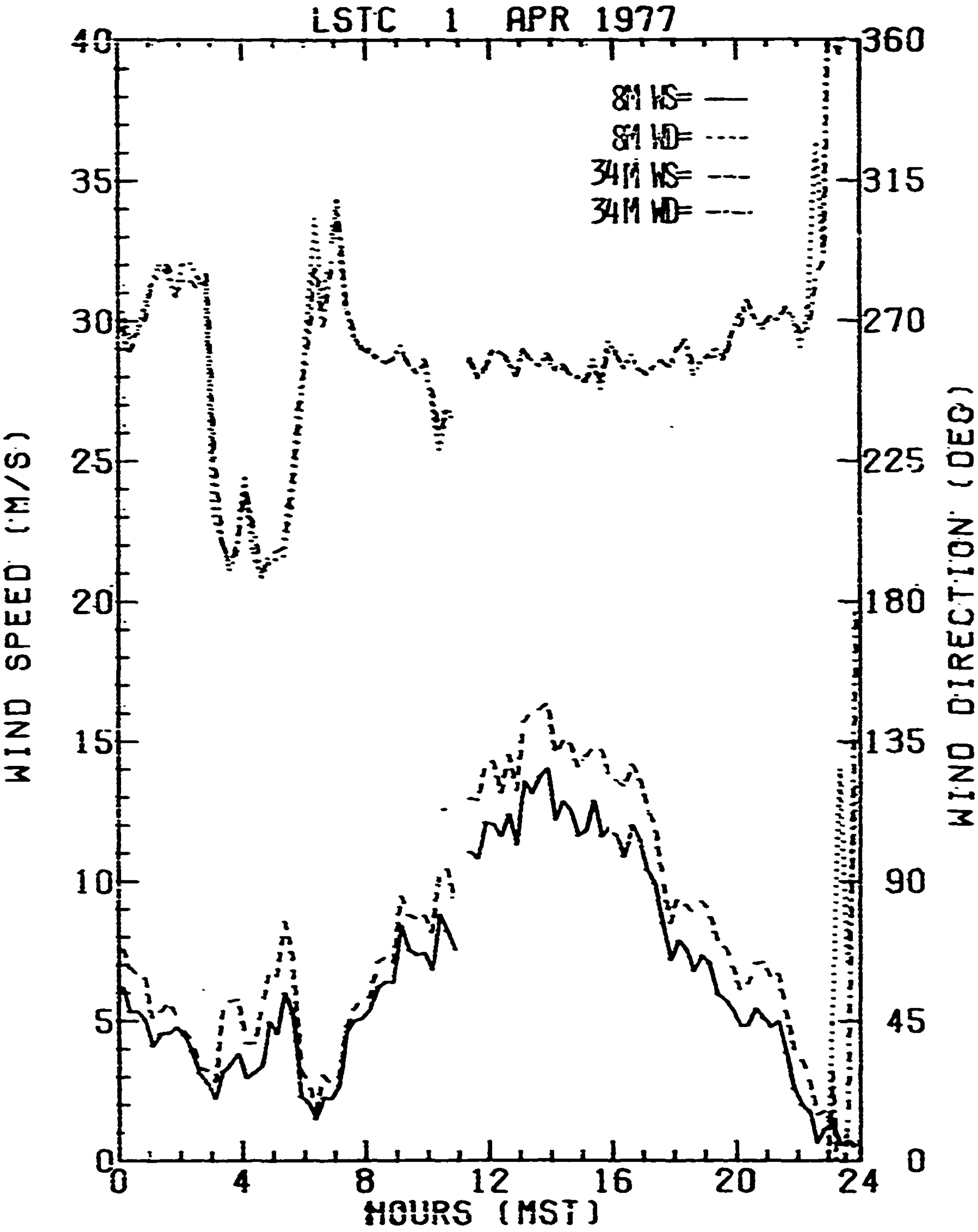


Figure 80. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 1 April 1977.

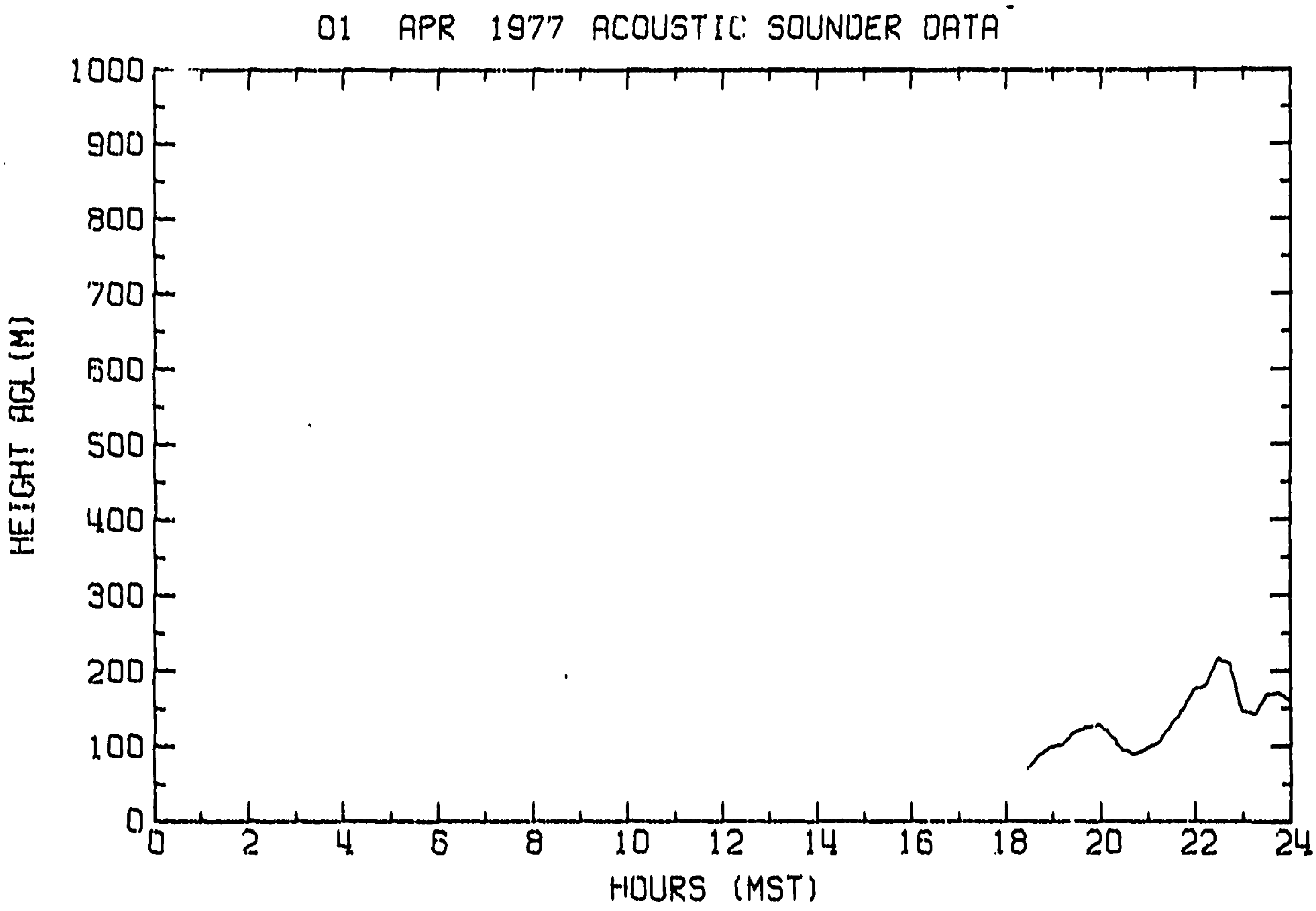


Figure 81. Inversion heights, LSTC, 1 April 1977.

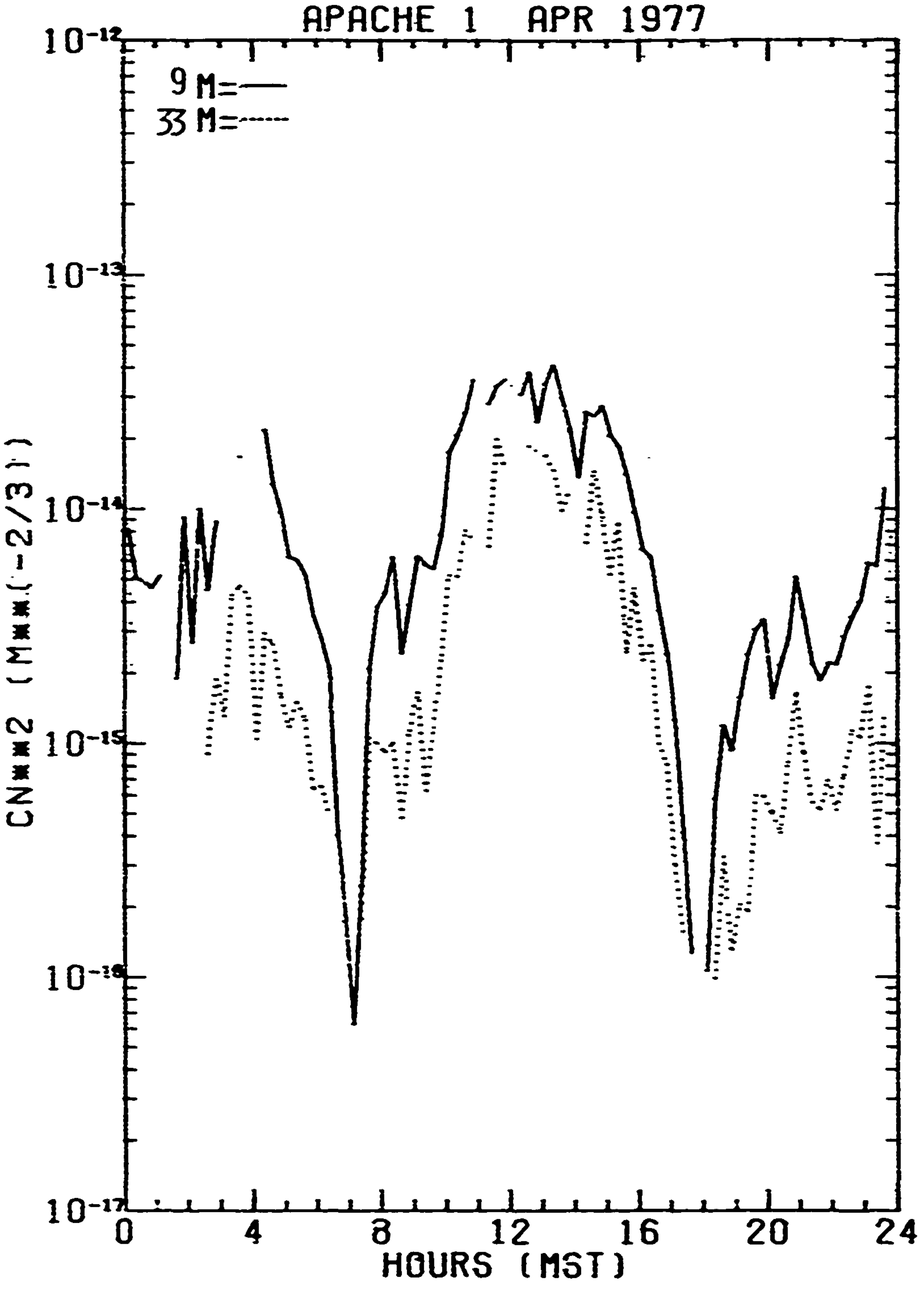


Figure 82. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 1 April 1977.

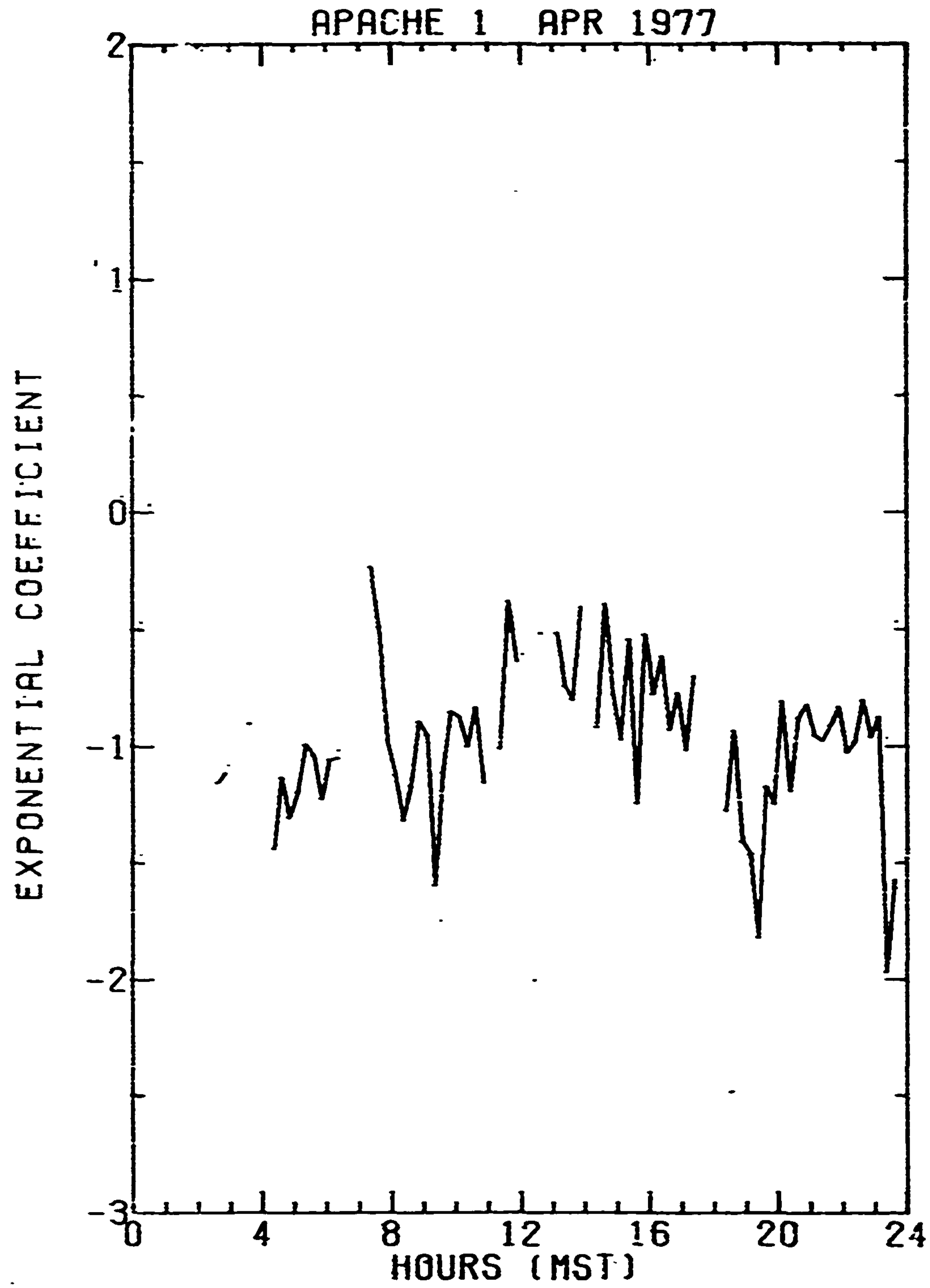


Figure 83. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 1 April 1977.

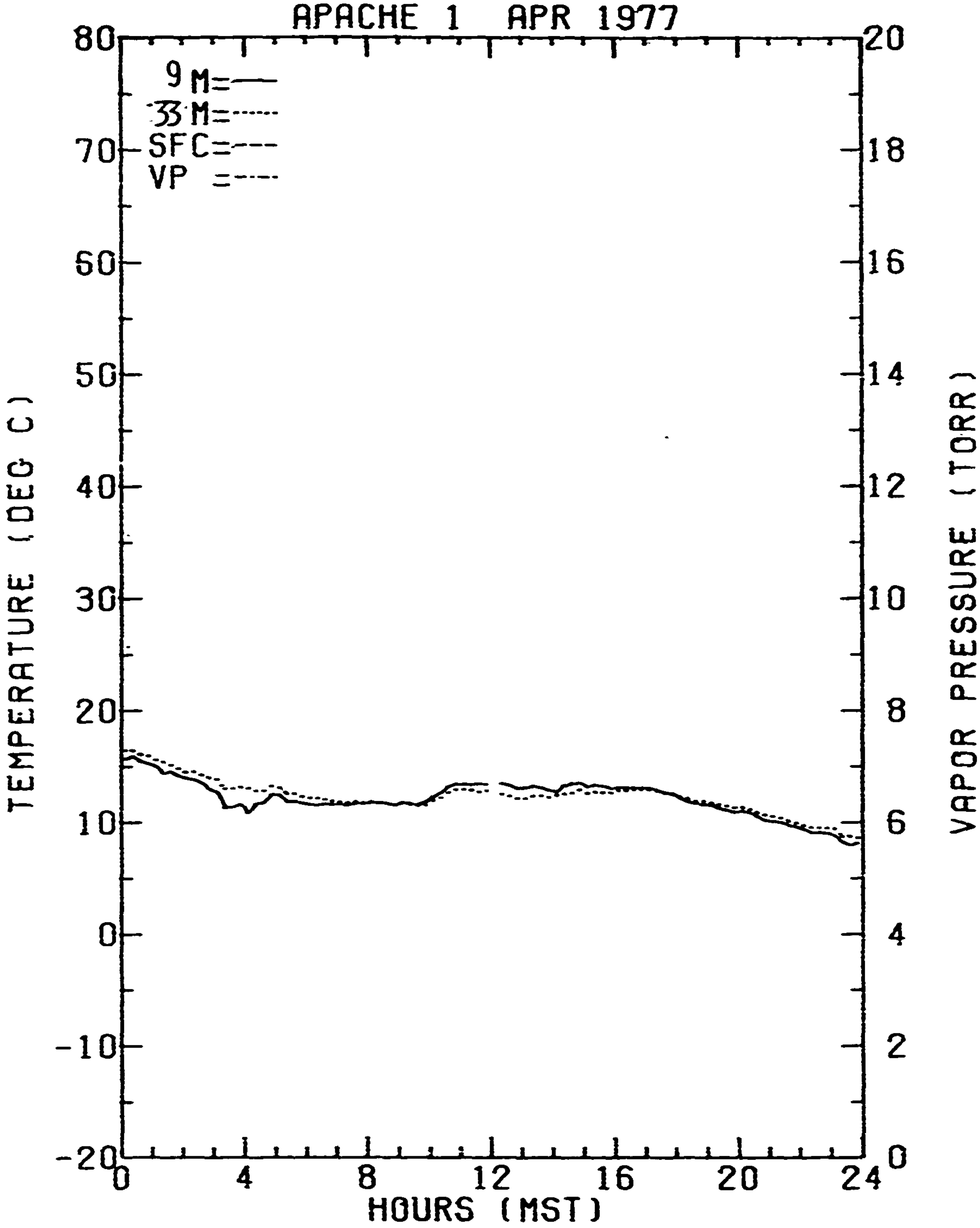


Figure 84. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 1 April 1977.

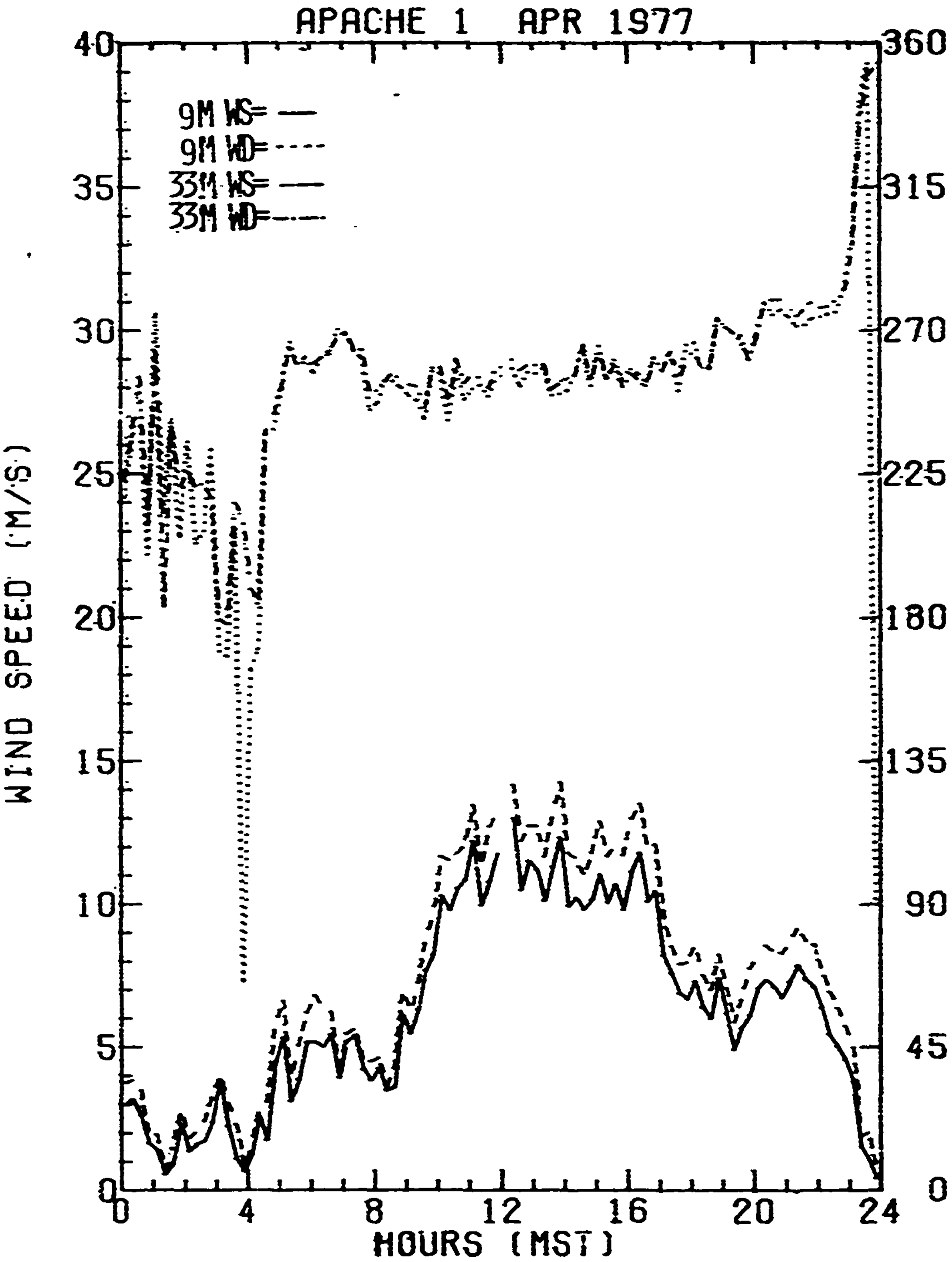


Figure 85. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 1 April 1977.

TABLE 51
APACHE SITE RAWINSONDE DATA

DATE: 01 APR 77 RELEASE NO.: 26 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.1	12.2	4.0	250.0	7.2
215.9	637.5	11.5	3.8	0.0	0.0
499.0	616.2	9.1	3.6	0.0	0.0
1296.1	559.0	2.0	3.2	228.0	22.5
1732.7	529.5	-1.2	2.4	225.7	26.3
1800.8	525.0	-2.1	2.7	226.4	26.5
2412.0	485.8	-7.4	1.8	228.8	31.5
2521.1	479.1	-8.1	1.1	229.1	31.5
2932.2	455.1	-6.9	0.6	230.0	32.2
3120.2	443.7	-6.8	0.7	228.3	24.7

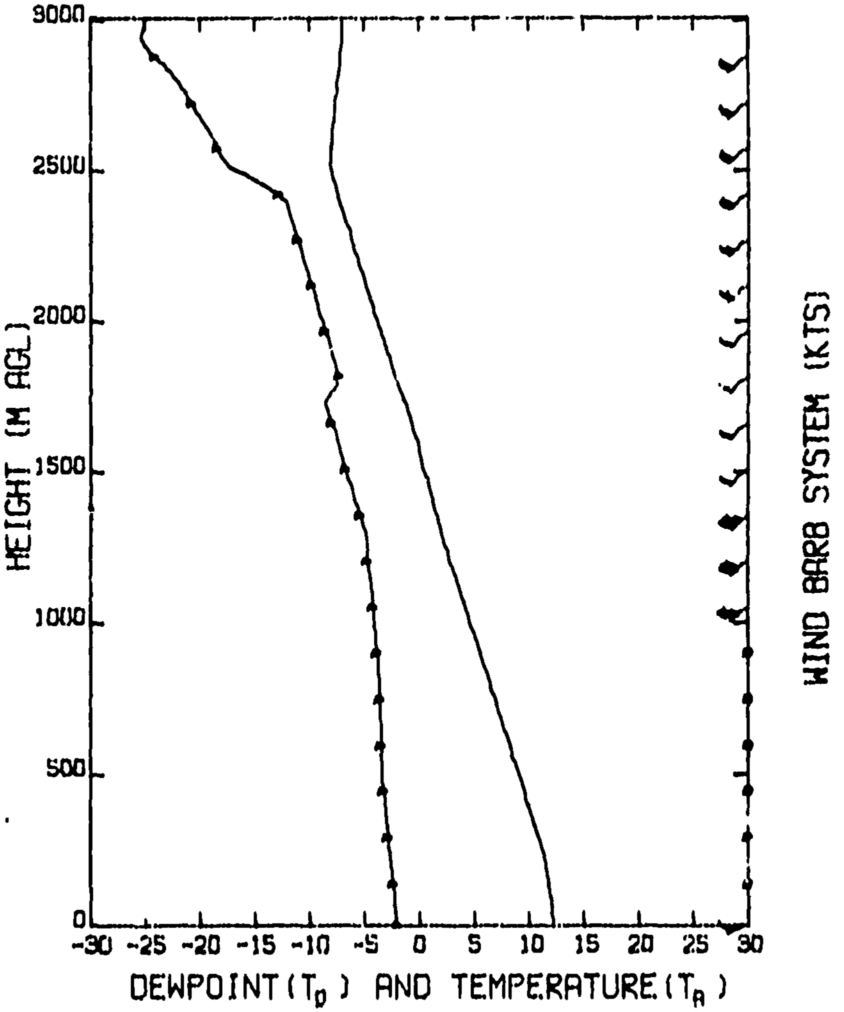


TABLE 52
APACHE SITE RAWINSONDE DATA

DATE: 01 APR 77 RELEASE NO.: 27 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.8	15.8	3.1	300.0	11.3
212.7	637.5	12.3	3.0	271.6	10.0
781.4	595.2	5.5	2.4	251.5	17.2
1791.8	525.0	-3.5	1.9	236.9	15.7
2268.5	494.1	-7.8	1.7	231.9	20.5
2476.1	481.0	-10.2	0.8	227.0	20.1
2500.3	479.6	-7.8	0.5	228.9	21.8
2712.0	466.6	-9.7	0.4	240.2	30.4
2752.0	464.2	-7.2	0.5	243.0	32.9
3138.9	441.7	-8.5	0.4	240.1	37.3

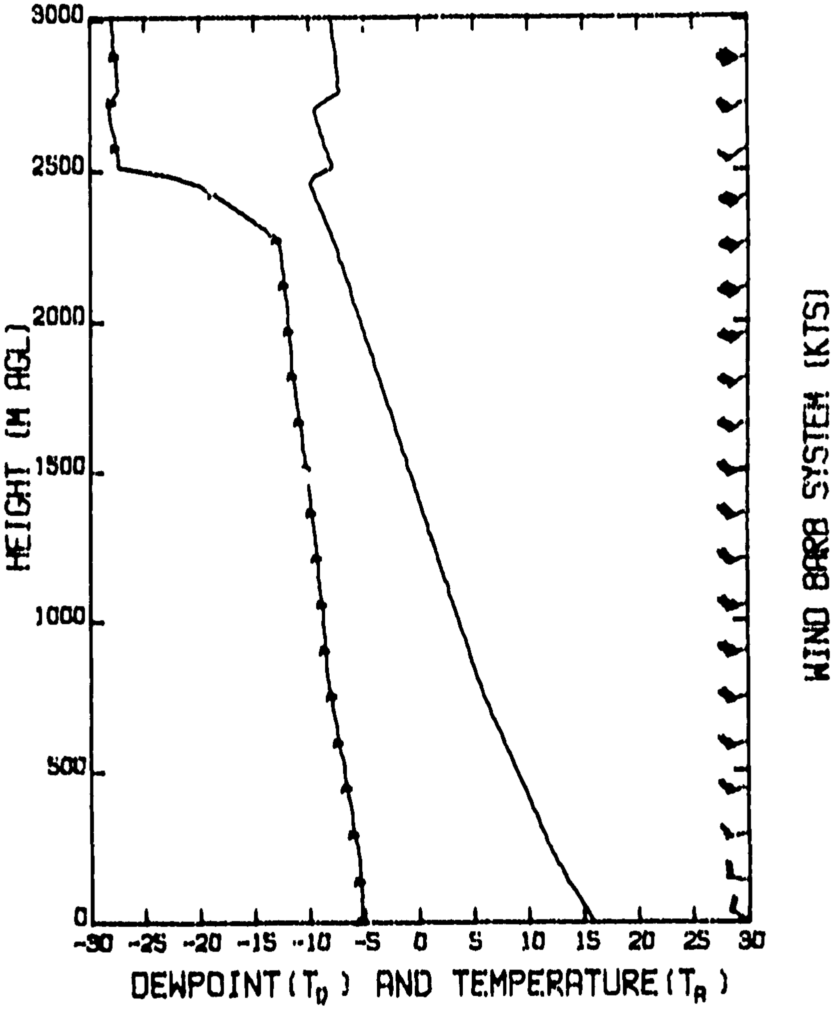


TABLE 53
APACHE SITE RAWINSONDE DATA

DATE: 01 APR 77 RELEASE NO.: 28 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL.)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.7	13.9	2.5	260.0	7.2
210.1	637.5	10.2	2.1	259.7	8.4
1657.5	533.5	-2.9	2.1	251.4	17.5
1784.3	525.0	-3.9	1.2	249.5	18.5
2160.5	500.5	-6.6	0.8	251.6	22.1
2483.4	480.2	-7.2	0.6	253.7	24.1
4362.8	375.0	-21.3	0.2	248.6	29.5

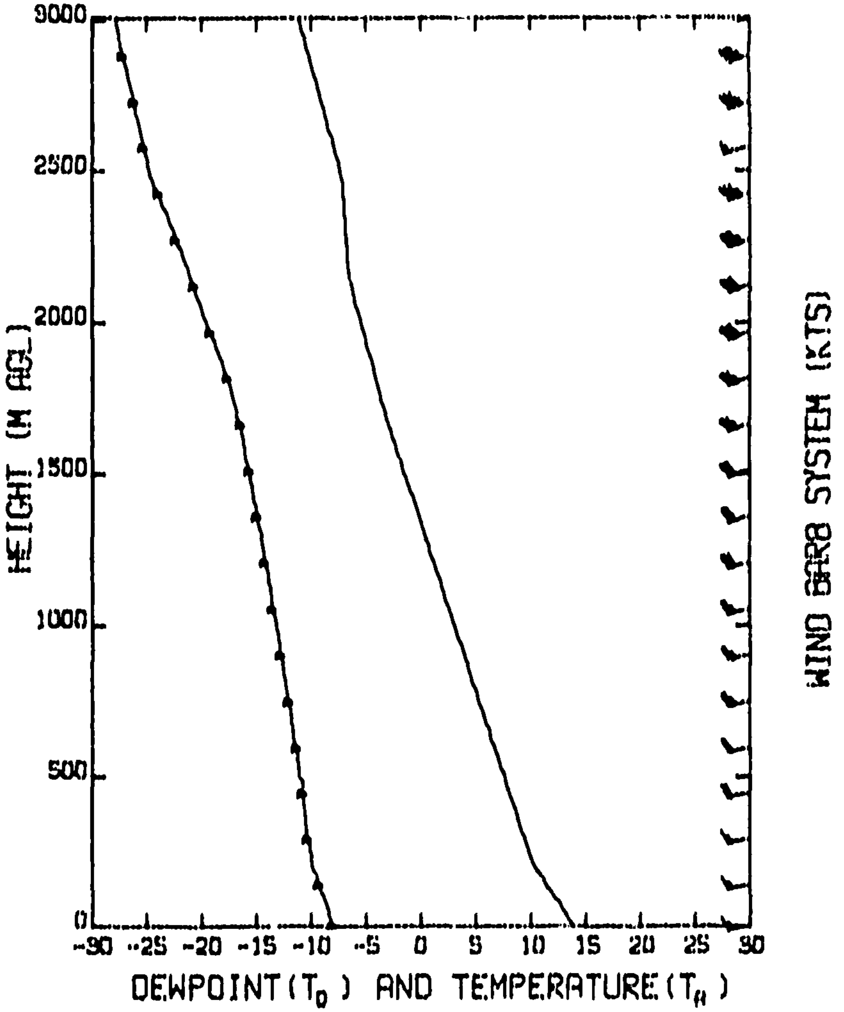
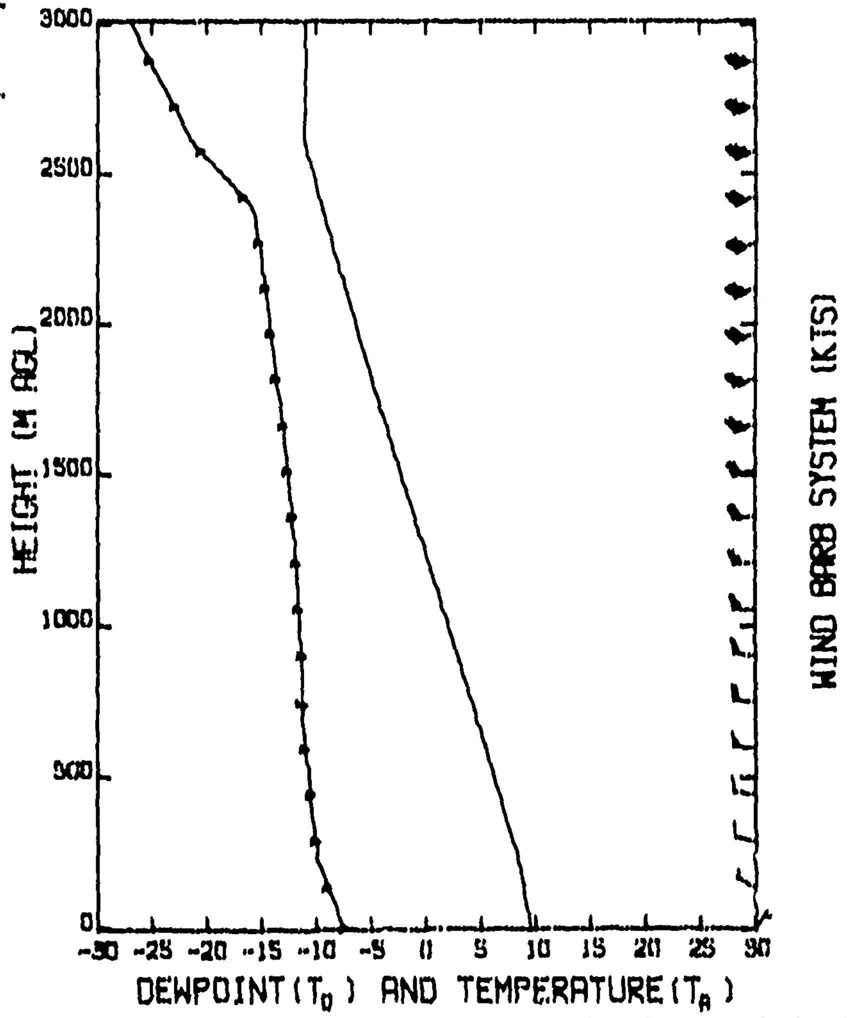


TABLE 54
APACHE SITE RAWINSONDE DATA

DATE: 01 APR 77 RELEASE NO.: 29 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.3	9.6	2.6	30.0	1.0
228.8	637.5	8.4	2.1	289.3	3.1
677.5	603.6	4.8	1.9	279.3	8.9
1796.3	525.0	-4.8	1.6	249.6	18.2
2383.7	487.0	-9.5	1.3	243.7	20.8
2606.8	473.1	-11.1	0.8	247.6	22.2
2854.8	458.1	-10.9	0.6	247.7	23.7
3202.6	437.8	-11.2	0.4	245.4	23.7



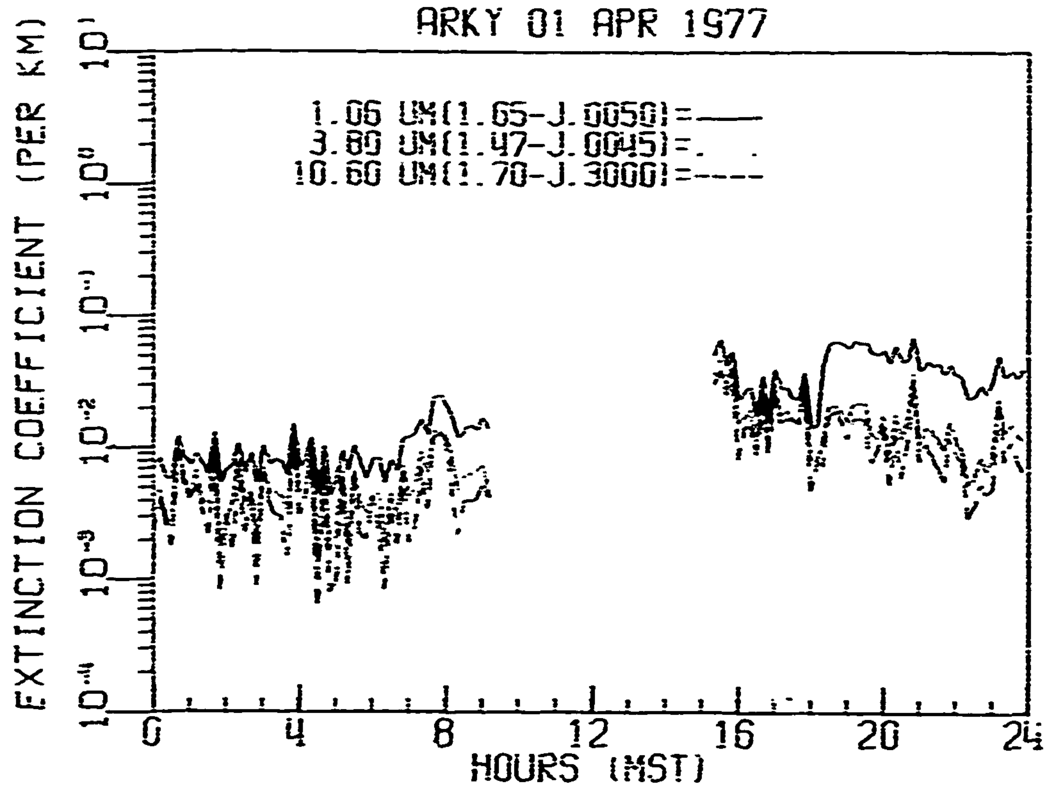


Figure 86. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 1 April 1977.

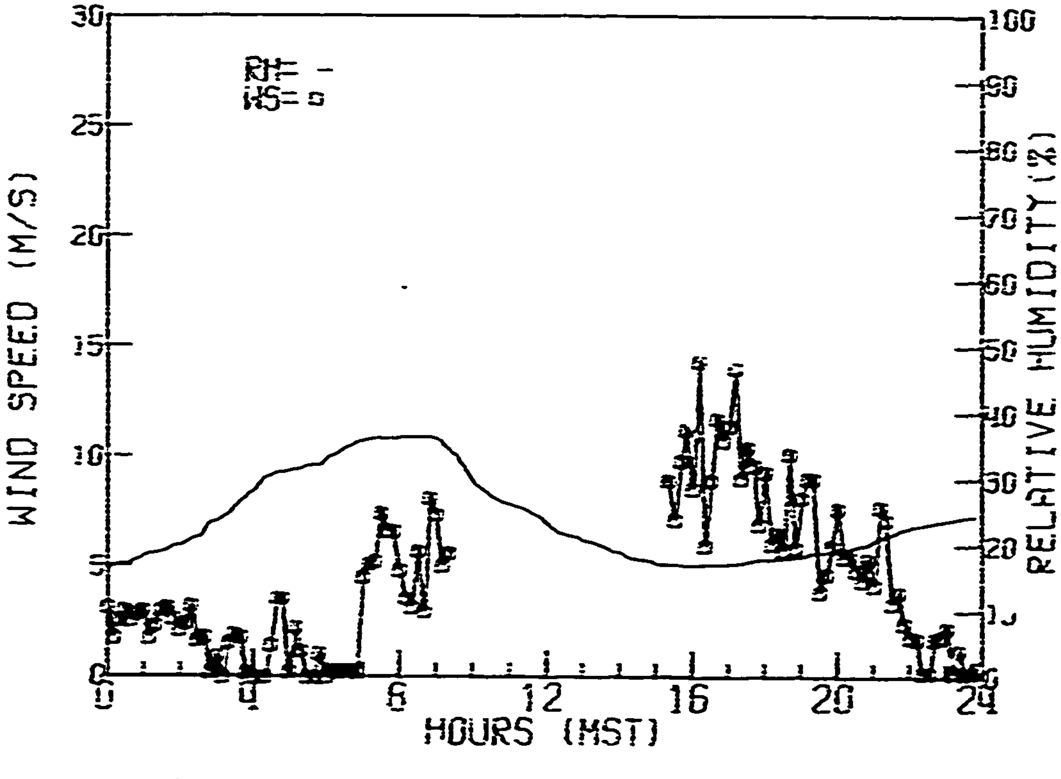


Figure 87. Diurnal variation of windspeed and relative humidity, Arky Site, 1 April 1977.

TABLE 88
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
01 APR 77													
00:00:00	600	.77+00	.41+00	.12+00	.15-01	.00	.00	.00	.00	.72-02	.43-02	.24-02	22.
00:10:00	600	.85+00	.30+00	.15+00	.00	.49-01	.00	.00	.00	.84-02	.49-02	.40-02	23.
00:20:00	600	.76+00	.24+00	.00	.00	.48-01	.00	.00	.00	.61-02	.27-02	.31-02	17.
00:30:00	600	.91+00	.17+00	.51-01	.15-01	.00	.00	.00	.00	.58-02	.28-02	.19-02	19.
00:40:00	600	.76+00	.32+00	.18+00	.00	.48-01	.20-01	.00	.00	.12-01	.97-02	.93-02	103.
00:50:00	600	.63+00	.32+00	.91-01	.33-01	.49-01	.00	.00	.00	.84-02	.63-02	.57-02	35.
01:00:00	600	.85+00	.28+00	.00	.15-01	.48-01	.00	.00	.00	.76-02	.41-02	.42-02	27.
01:10:00	600	.94+00	.21+00	.91-01	.41-01	.00	.00	.00	.00	.91-02	.59-02	.52-02	45.
01:20:00	600	.94+00	.26+00	.91-01	.00	.48-01	.00	.00	.00	.77-02	.39-02	.36-02	21.
01:30:00	600	.79+00	.28+00	.12+00	.15-01	.00	.00	.00	.00	.65-02	.38-02	.23-02	23.
01:40:00	600	.10+01	.41+00	.21+00	.15-01	.00	.20-01	.00	.00	.13-01	.10-01	.82-02	106.
01:50:00	600	.93+00	.30+00	.30-01	.00	.00	.00	.00	.00	.56-02	.18-02	.95-03	11.
02:00:00	600	.10+01	.15+00	.30-01	.00	.48-01	.00	.00	.00	.69-02	.29-02	.32-02	19.
02:10:00	600	.95+00	.41+00	.14+00	.00	.00	.00	.00	.00	.75-02	.39-02	.17-02	15.
02:20:00	600	.96+00	.15+00	.15+00	.15-01	.00	.20-01	.00	.00	.11-01	.84-02	.75-02	101.
02:30:00	600	.90+00	.11+00	.14+00	.15-01	.00	.00	.00	.00	.66-02	.43-02	.23-02	20.
02:40:00	600	.11+01	.32+00	.30-01	.15-01	.48-01	.00	.00	.00	.91-02	.47-02	.45-02	30.
02:50:00	600	.93+00	.26+00	.61-01	.00	.00	.00	.00	.00	.56-02	.23-02	.74-03	11.
03:00:00	600	.10+01	.28+00	.61-01	.46-01	.48-01	.00	.00	.00	.10-01	.72-02	.66-02	46.
03:10:00	600	.81+00	.28+00	.15+00	.00	.49-01	.00	.00	.00	.78-02	.45-02	.39-02	22.
03:20:00	600	.11+01	.21+00	.91-01	.30-01	.00	.00	.00	.00	.81-02	.46-02	.32-02	29.
03:30:00	600	.13+01	.34+00	.33-01	.33-01	.00	.00	.00	.00	.73-02	.43-02	.30-02	29.
03:40:00	600	.77+00	.39+00	.15+00	.00	.00	.00	.00	.00	.64-02	.34-02	.15-02	14.
03:50:00	600	.13+01	.41+00	.61-01	.76-01	.49-01	.20-01	.00	.00	.15-01	.12-01	.12-01	129.
04:00:00	600	.86+00	.28+00	.91-01	.30-01	.00	.00	.00	.00	.74-02	.47-02	.32-02	28.
04:10:00	600	.13+01	.24+00	.61-01	.15-01	.49-01	.00	.00	.00	.86-02	.47-02	.45-02	29.
04:20:00	600	.74+00	.36+00	.61-01	.46-01	.00	.20-01	.00	.00	.12-01	.10-01	.94-02	117.
04:30:00	600	.83+00	.19+00	.33-01	.00	.00	.00	.00	.00	.46-02	.14-02	.57-03	9.
04:40:00	600	.96+00	.39+00	.30-01	.00	.00	.20-01	.00	.00	.10-01	.67-02	.62-02	93.
04:50:00	600	.79+00	.11+00	.91-01	.00	.00	.00	.00	.00	.44-02	.17-02	.53-03	9.
05:00:00	600	.88+00	.30+00	.61-01	.00	.00	.00	.00	.00	.56-02	.21-02	.98-03	11.
05:10:00	600	.82+00	.32+00	.12+00	.33-01	.49-01	.00	.00	.00	.95-02	.68-02	.59-02	39.
05:20:00	600	.12+01	.41+00	.00	.00	.00	.00	.00	.00	.69-02	.19-02	.93-03	13.
05:30:00	600	.13+01	.30+00	.61-01	.00	.00	.20-01	.00	.00	.13-01	.68-02	.63-02	93.
05:40:00	600	.10+01	.41+00	.61-01	.15-01	.00	.00	.00	.00	.77-02	.37-02	.22-02	22.
05:50:00	600	.89+00	.13+00	.12+00	.15-01	.00	.00	.00	.00	.53-02	.33-02	.21-02	19.
06:00:00	600	.10+01	.24+00	.30-01	.15-01	.48-01	.00	.00	.00	.83-02	.43-02	.44-02	28.
06:10:00	600	.12+01	.26+00	.15+00	.15-01	.00	.00	.00	.00	.85-02	.45-02	.26-02	24.
06:20:00	600	.10+01	.19+00	.61-01	.00	.00	.00	.00	.00	.55-02	.18-02	.87-03	11.
06:30:00	600	.12+01	.13+00	.12+00	.33-01	.00	.00	.00	.00	.91-02	.45-02	.32-02	29.
06:40:00	600	.11+01	.28+00	.30-01	.15-01	.00	.00	.00	.00	.68-02	.29-02	.19-02	20.

TABLE 5B (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
01 APR 77														
	06:50:00	600	.12+01	.32+00	.12+00	.00	.00	.20-01	.00	.00	.12-01	.76-02	.67-02	96.
	07:00:00	600	.19+01	.93+00	.30-01	.00	.00	.00	.00	.00	.12-01	.43-02	.20-02	24.
	07:10:00	600	.23+01	.41+00	.27+00	.00	.00	.00	.00	.00	.13-01	.50-02	.26-02	27.
	07:20:00	600	.24+01	.39+00	.12+00	.76-01	.00	.00	.00	.00	.17-01	.93-02	.73-02	66.
	07:30:00	600	.16+01	.75+00	.18+00	.15-01	.00	.00	.00	.00	.13-01	.65-02	.35-02	33.
	07:40:00	600	.29+01	.92+00	.91-01	.30-01	.49-01	.20-01	.00	.00	.24-01	.10-01	.12-01	139.
	07:50:00	600	.31+01	.77+00	.12+00	.00	.96-01	.20-01	.00	.00	.25-01	.13-01	.13-01	132.
	08:00:00	600	.20+01	.60+00	.19+00	.15-01	.49-01	.20-01	.00	.00	.21-01	.13-01	.11-01	126.
	08:10:00	600	.22+01	.88+00	.15+00	.30-01	.00	.00	.00	.00	.17-01	.81-02	.47-02	47.
	08:20:00	600	.23+01	.54+00	.15+00	.00	.00	.00	.00	.00	.12-01	.47-02	.22-02	24.
	08:30:00	600	.21+01	.47+00	.12+00	.30-01	.00	.00	.00	.00	.14-01	.62-02	.40-02	40.
	08:40:00	600	.25+01	.44+00	.12+00	.30-01	.00	.00	.00	.00	.15-01	.53-02	.41-02	43.
	08:50:00	600	.17+01	.79+00	.91-01	.30-01	.00	.00	.00	.00	.14-01	.69-02	.42-02	41.
	09:00:00	600	.23+01	.54+00	.14+00	.00	.49-01	.00	.00	.00	.17-01	.75-02	.53-02	39.
	09:10:00	600	.24+01	.43+00	.61-01	.00	.48-01	.00	.00	.00	.14-01	.48-02	.42-02	32.
	09:20:00	600	.22+01	.60+00	.12+00	.15-01	.49-01	.00	.00	.00	.16-01	.73-02	.57-02	44.
	15:20:00	600	.86+01	.18+01	.82+00	.11+00	.19+00	.20-01	.00	.00	.53-01	.37-01	.33-01	250.
	15:30:00	600	.63+01	.21+01	.12+01	.91-01	.11+00	.59-01	.00	.00	.68-01	.48-01	.40-01	412.
	15:40:00	600	.78+01	.15+01	.33+00	.12+00	.48-01	.39-01	.00	.00	.43-01	.31-01	.26-01	292.
	15:50:00	600	.39+01	.13+01	.59+00	.61-01	.19+00	.79-01	.00	.00	.55-01	.42-01	.41-01	449.
	16:00:00	600	.27+01	.86+00	.71+00	.46-01	.00	.00	.00	.00	.24-01	.16-01	.87-02	71.
	16:10:00	600	.33+01	.77+00	.37+00	.46-01	.49-01	.20-01	.00	.00	.27-01	.18-01	.15-01	153.
	16:20:00	600	.29+01	.11+01	.46+00	.76-01	.00	.20-01	.00	.00	.29-01	.20-01	.15-01	165.
	16:30:00	600	.24+01	.21-01	.37+00	.61-01	.49-01	.00	.00	.00	.18-01	.11-01	.72-02	65.
	16:40:00	600	.32+01	.97+00	.37+00	.46-01	.96-01	.39-01	.00	.00	.35-01	.25-01	.23-01	246.
	16:50:00	600	.20+01	.13+00	.33+00	.30-01	.95-01	.00	.00	.00	.17-01	.11-01	.75-02	53.
	17:00:00	600	.30+01	.11+01	.49+00	.13+00	.00	.39-01	.00	.00	.40-01	.32-01	.26-01	294.
	17:10:00	600	.31+01	.85+00	.33+00	.30-01	.95-01	.20-01	.00	.00	.29-01	.18-01	.16-01	155.
	17:20:00	600	.28+01	.84+00	.27+00	.46-01	.00	.39-01	.00	.00	.29-01	.20-01	.17-01	222.
	17:30:00	600	.22+01	.54+00	.19+00	.15-01	.49-01	.39-01	.00	.00	.24-01	.17-01	.16-01	204.
	17:40:00	600	.21+01	.62+00	.18+00	.76-01	.48-01	.20-01	.00	.00	.24-01	.17-01	.15-01	158.
	17:50:00	600	.23+01	.77+00	.33+00	.61-01	.49-01	.79-01	.00	.00	.58-01	.32-01	.31-01	397.
	18:00:00	600	.19+01	.62+00	.27+00	.30-01	.00	.00	.00	.00	.15-01	.84-02	.49-02	44.
	18:10:00	600	.14+01	.48+00	.91-01	.15-01	.95-01	.00	.00	.00	.16-01	.82-02	.79-02	49.
	18:20:00	600	.91+01	.75+00	.15+00	.46-01	.00	.00	.00	.00	.43-01	.12-01	.76-02	99.
	18:30:00	600	.12+02	.79+00	.21+00	.61-01	.49-01	.20-01	.00	.00	.62-01	.21-01	.18-01	219.
	18:40:00	600	.13+02	.71+00	.15+00	.15-01	.48-01	.39-01	.00	.00	.66-01	.21-01	.20-01	276.
	18:50:00	600	.12+02	.97+00	.27+00	.00	.95-01	.20-01	.00	.00	.63-01	.19-01	.17-01	199.
	19:00:00	600	.12+02	.11+01	.24+00	.46-01	.48-01	.00	.00	.00	.58-01	.17-01	.12-01	133.
	19:10:00	600	.12+02	.15+01	.27+00	.73-01	.49-01	.20-01	.00	.00	.66-01	.22-01	.17-01	211.
	19:20:00	600	.12+02	.13+01	.43+00	.30-01	.48-01	.20-01	.00	.00	.63-01	.22-01	.17-01	210.

TABLE 56 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
01 APR 77													
19:30:00	600	.11+02	.15+01	.43+00	.15-01	.48-01	.26-01	.00	.00	.63-01	.22-01	.16-01	203.
19:40:00	599	.12+02	.99+00	.21+00	.33-01	.00	.00	.00	.00	.55-01	.13-01	.90-02	113.
19:50:00	600	.11+02	.19+00	.18+00	.00	.00	.20-01	.00	.00	.51-01	.12-01	.97-02	162.
20:00:00	599	.11+02	.11+01	.27+00	.19-01	.44-01	.27-01	.00	.00	.54-01	.14-01	.15-01	155.
20:10:00	600	.99+01	.97+00	.00	[illegible]	.00	.00	.00	.00	.45-01	.86-02	.53-02	87.
20:20:00	599	.12+02	.13+01	.37+00	.46-01	.49-01	.00	.00	.00	.53-01	.19-01	.13-01	139.
20:30:00	600	.97+01	.11+01	.40+00	.00	.00	.00	.00	.00	.47-01	.12-01	.63-02	87.
20:40:00	599	.92+01	.13+01	.43+00	.76-01	.00	.00	.00	.00	.49-01	.15-01	.11-01	125.
20:50:00	600	.10+02	.99+00	.58+00	.14+00	.14+00	.39-01	.00	.00	.70-01	.38-01	.35-01	357.
21:00:00	599	.81+01	.99+00	.19+00	.15-01	.49-01	.00	.00	.00	.43-01	.11-01	.90-02	95.
21:10:00	600	.87+01	.82+00	.24+00	.15-01	.00	.26-01	.00	.00	.45-01	.15-01	.11-01	163.
21:20:00	599	.85+01	.11+01	.15+00	.61-01	.00	.00	.00	.00	.44-01	.14-01	.70-02	109.
21:30:00	600	.88+01	.10+01	.24+00	.30-01	.00	.00	.00	.00	.44-01	.12-01	.73-02	94.
21:40:00	599	.79+01	.92+00	.21+00	.15-01	.00	.00	.00	.00	.38-01	.13-01	.57-02	77.
21:50:00	600	.79+01	.92+00	.28+00	.30-01	.00	.26-01	.00	.00	.44-01	.16-01	.12-01	167.
22:00:00	599	.73+01	.64+00	.19+00	.00	.00	.23-01	.00	.00	.37-01	.17-01	.72-02	141.
22:10:00	600	.66+01	.43+00	.91-01	.00	.00	.20-01	.00	.00	.33-01	.98-02	.82-02	132.
22:20:00	599	.55+01	.47+00	.19+00	.00	.00	.00	.00	.00	.25-01	.55-02	.30-02	45.
22:30:00	600	.55+01	.49+00	.91-01	.15-01	.00	.00	.00	.00	.26-01	.61-02	.38-02	53.
22:40:00	599	.63+01	.47+00	.14+00	.33-01	.00	.00	.00	.00	.33-01	.85-02	.55-02	69.
22:50:00	600	.56+01	.36+00	.91-01	.30-01	.00	.00	.00	.00	.26-01	.69-02	.47-02	61.
23:00:00	599	.65+01	.92+00	.14+00	.15-01	.00	.00	.00	.00	.32-01	.93-02	.51-02	67.
23:10:00	600	.81+01	.84+00	.24+00	.61-01	.48-01	.39-01	.00	.00	.52-01	.24-01	.22-01	274.
23:20:00	599	.64+01	.99+00	.37+00	.46-01	.00	.00	.00	.00	.36-01	.13-01	.91-02	59.
23:30:00	600	.67+01	.82+00	.33+00	.61-01	.48-01	.00	.00	.00	.38-01	.16-01	.11-01	106.
23:40:00	599	.65+01	.13+01	.24+00	.61-01	.00	.00	.00	.00	.55-01	.14-01	.56-02	95.
23:50:00	600	.75+01	.12+01	.18+00	.30-01	.00	.00	.00	.00	.39-01	.12-01	.69-02	87.

Weather Summary

Date: 2 April 1977

Synoptic

Surface: Deep surface low-pressure area over Iowa with cold fronts extending south into eastern Texas and southwestward into southeastern Colorado.

500 Millibar: Closed low center over western Utah and eastern Nevada with continued strong southwesterly flow over New Mexico.

Holloman AFB

Clouds: Mostly clear. Few middle clouds (altocumulus) at 3000 m AGL.

Wind: Southwesterly 5-10 m sec^{-1} with peak gust of 13 m sec^{-1} from the southwest at 1000 MST.

Visibility: Greater than 60 km.

Maximum temperature:	19.4°C	Corresponding vapor pressure:	2.5 Torr
Minimum temperature:	2.8°C	Corresponding vapor pressure:	2.2 Torr

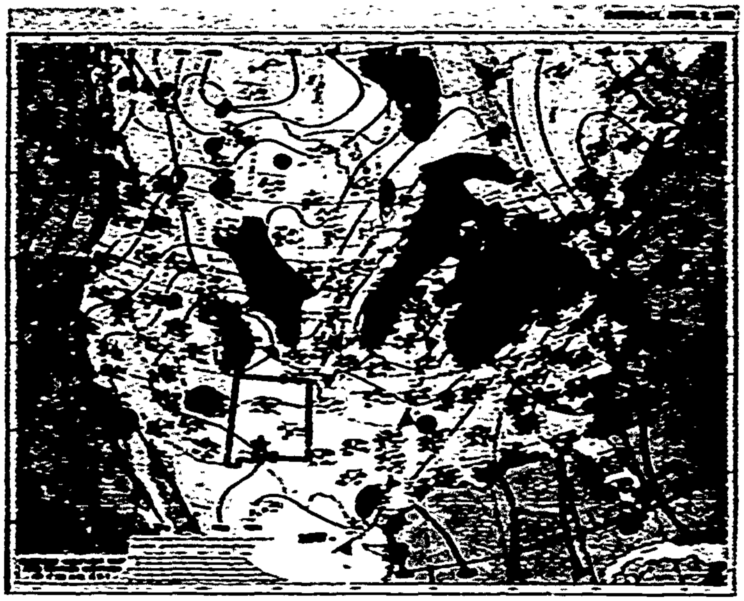


Figure 88a. Surface weather map for 2 April 1977.

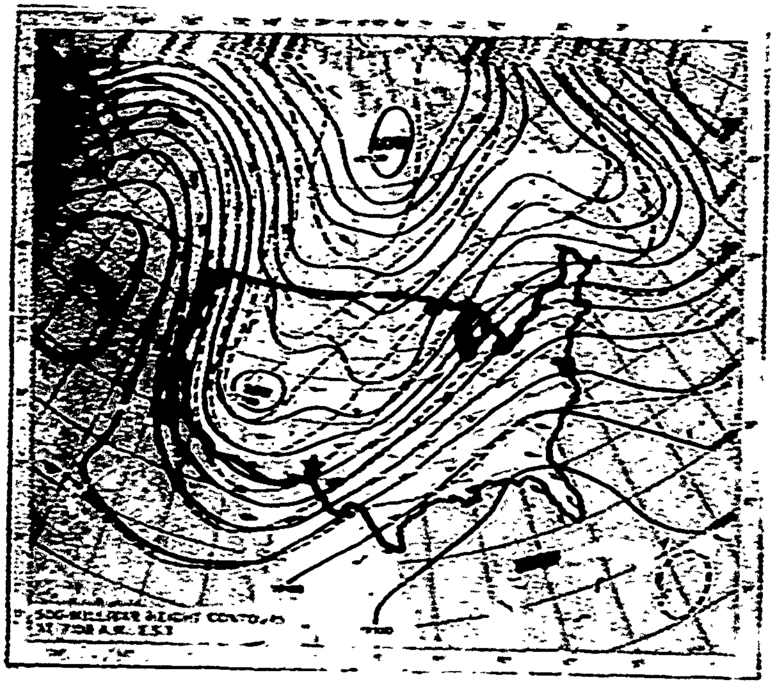


Figure 88b. 500-millibar height contours for 2 April 1977.

TABLE 56. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER. AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 2 April 1977 Remarks
0100	6.8	2.3	-9.2	0	0	0	
0200	6.5	2.0	-11.2	0	0	0	
0300	6.8	2.1	-10.0	0	0	0	
0400	3.0	2.1	-10.5	0	0	0	
0500	2.1	2.0	-11.0	0	0	0	
0600	0.7	2.2	-9.9	0	0	0	
0700	5.6	2.4	-8.4	0	0	0	
0800	10.5	2.6	-7.4	0	0	0	
0900	12.0	2.5	-8.1	0	0	0	
1000	13.0	2.1	-10.1	0	0	05 Ci	
1100	14.5	2.4	-8.4	0	0	05 Ci	
1200	15.9	2.8	-6.5	0	0	0	Checked u-v-w sensors and balanced "T's"
1300	16.6	2.4	-8.5	0	0	0	
1400	18.0	2.4	-8.3	0	0	0	
1500	20.1	2.5	-8.2	05 Cu	0	0	
1600	19.0	2.8	-6.7	05 Cu	0	0	
1700	18.0	2.4	-8.3	05 Sc	0	0	1730 - plane observed
1800	16.5	2.3	-9.3	10 Sc	0	0	
1900	15.2	2.2	-9.6	10 Sc	0	0	
2000	14.1	1.7	-12.7	10 Sc	0	0	
2100	11.9	2.8	-6.7	0	0	0	
2200	9.6	2.9	-6.3	0	0	0	
2300	9.2	2.9	-6.3	0	0	0	
2400	9.4	3.1	-5.2	0	10 ACSL	0	2400 - plane observed

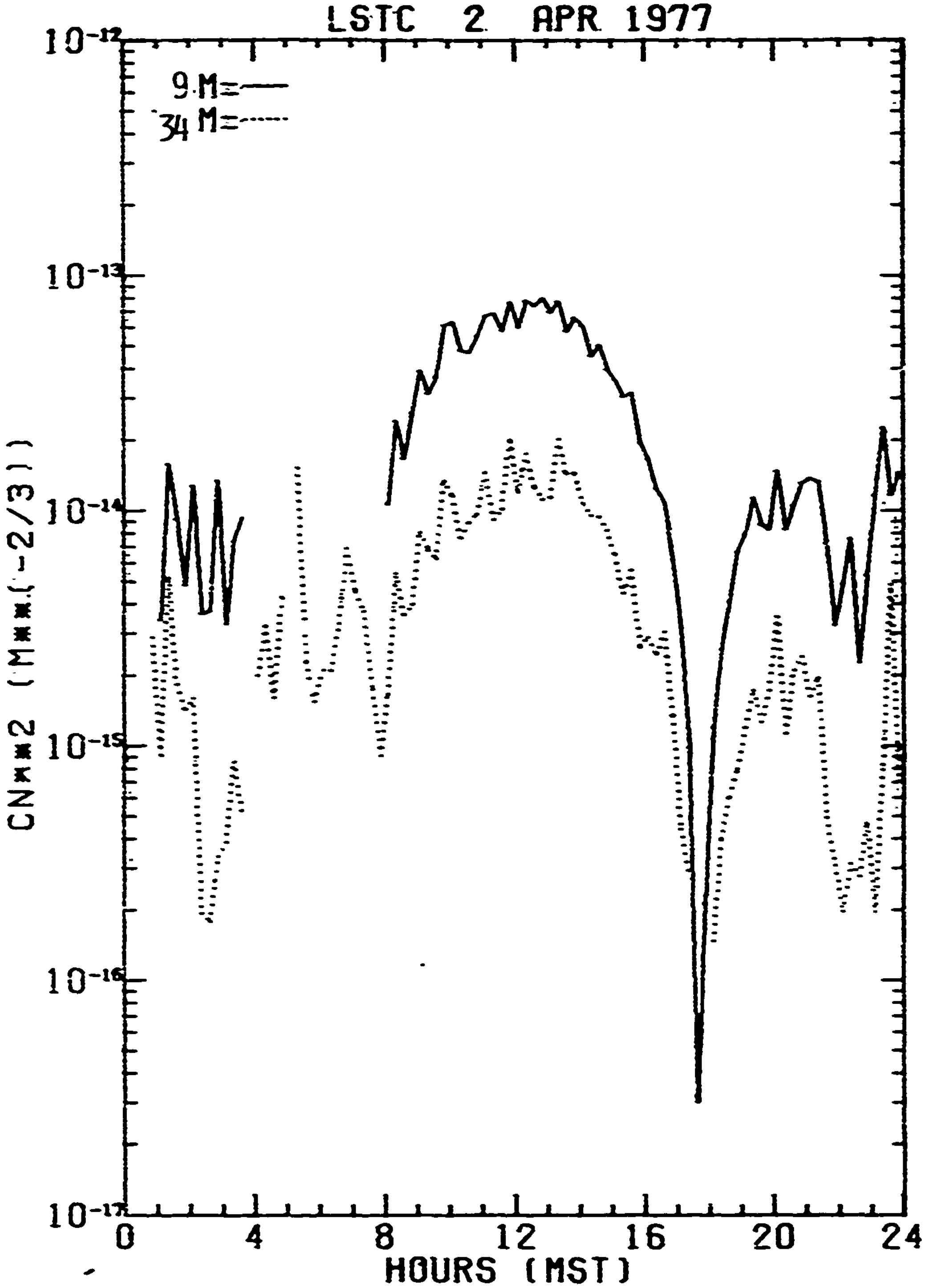


Figure 89. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 2 April 1977.

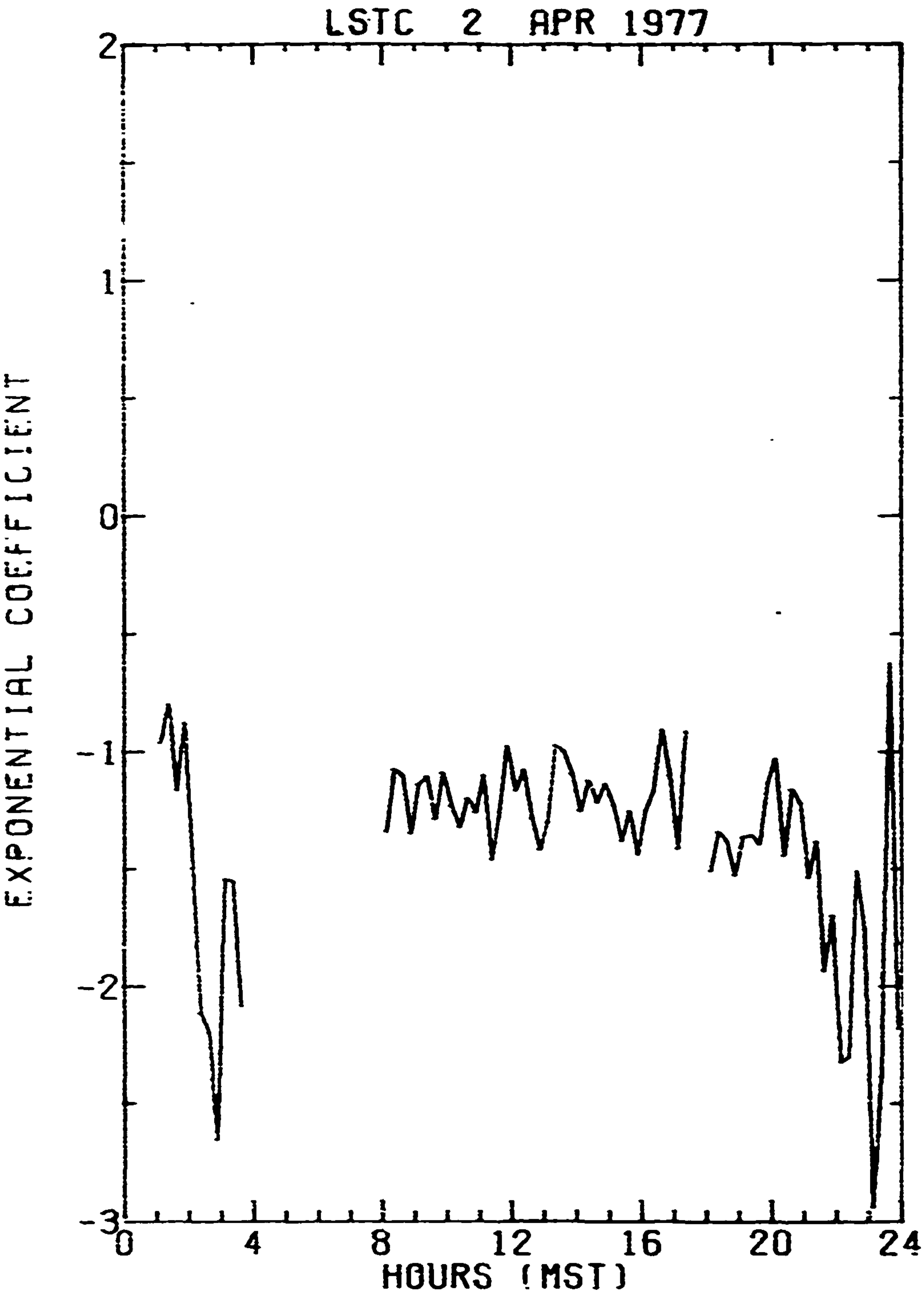


Figure 90. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 2 April 1977.

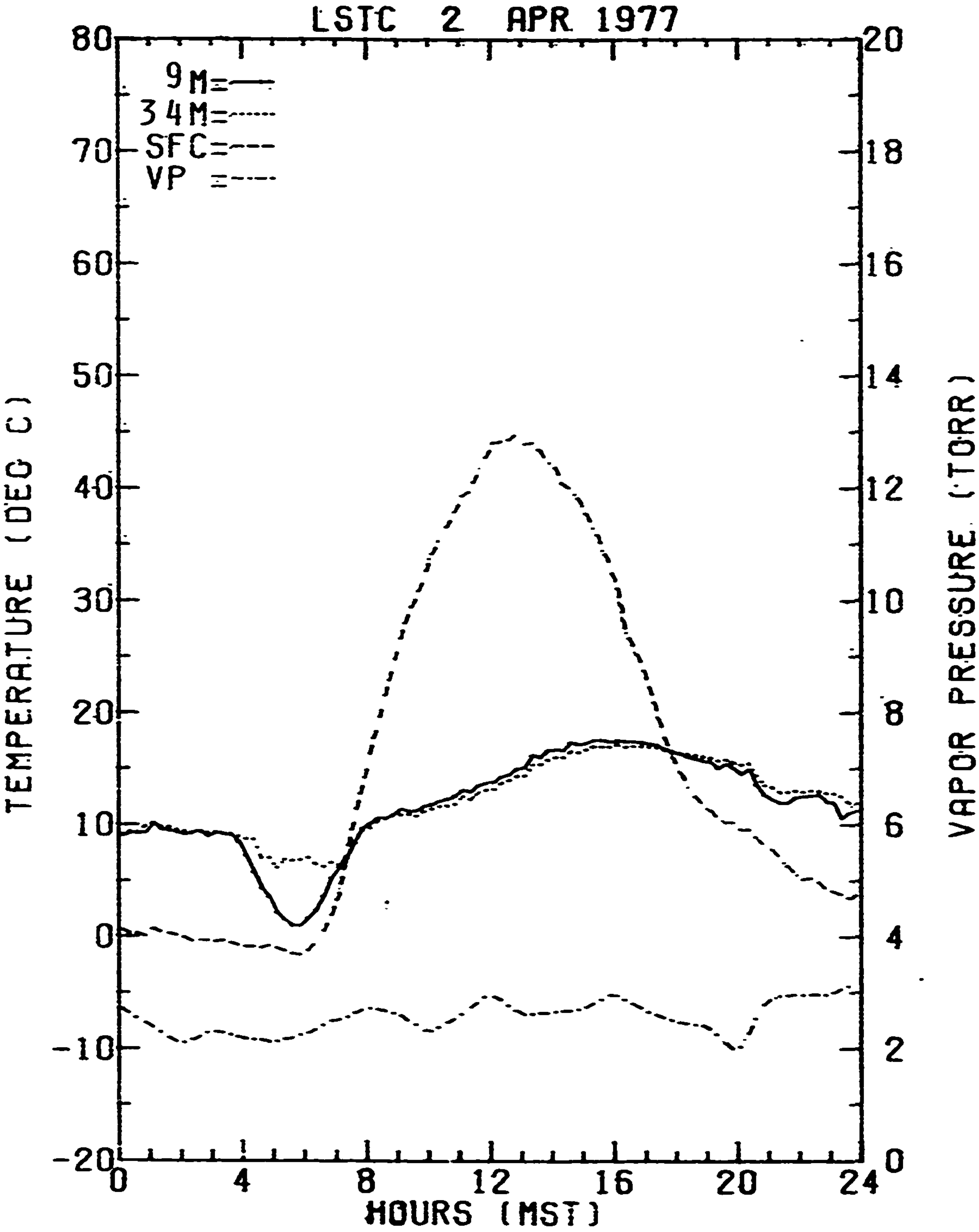


Figure 91. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 2 April 1977.

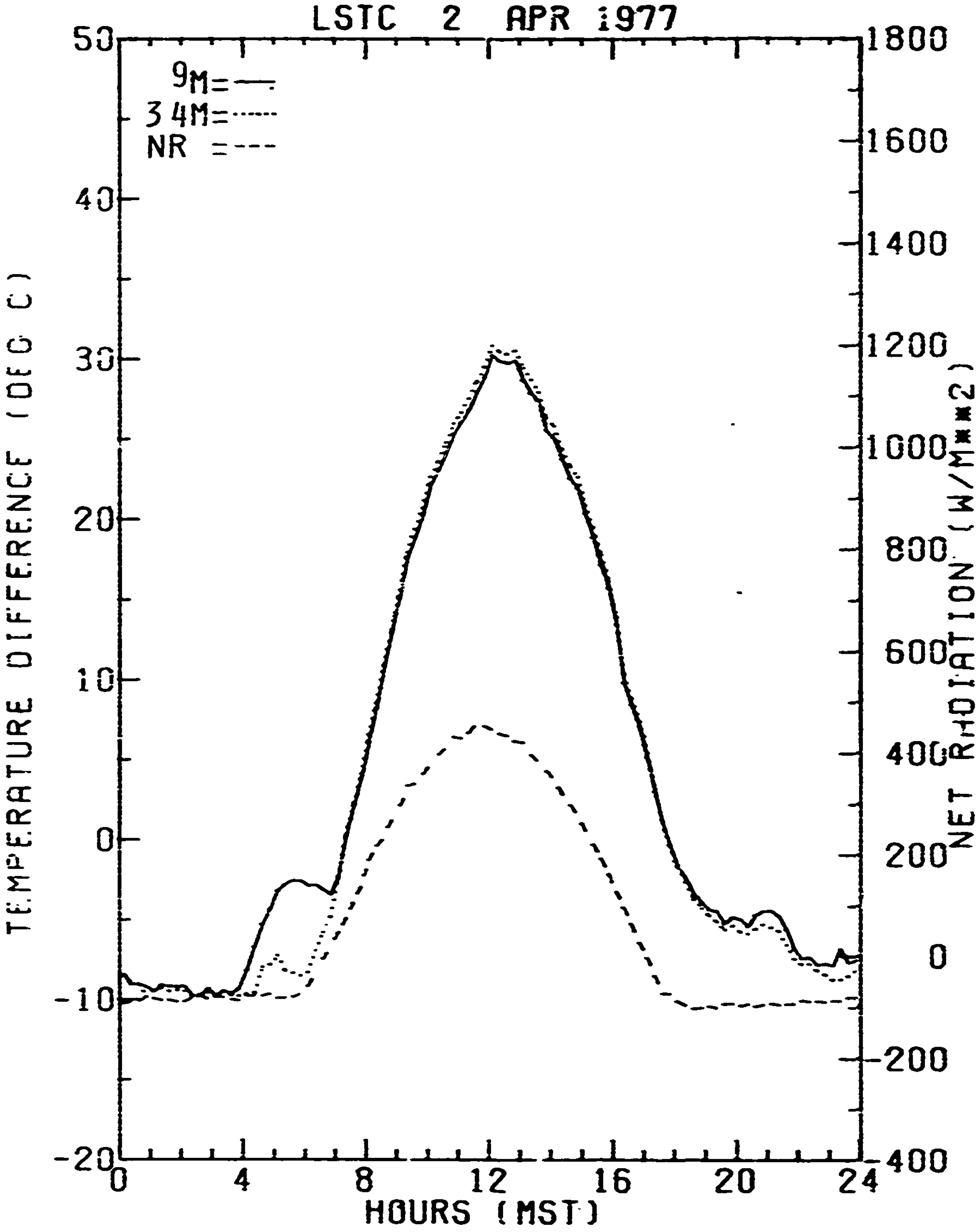


Figure 92. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 2 April 1977.

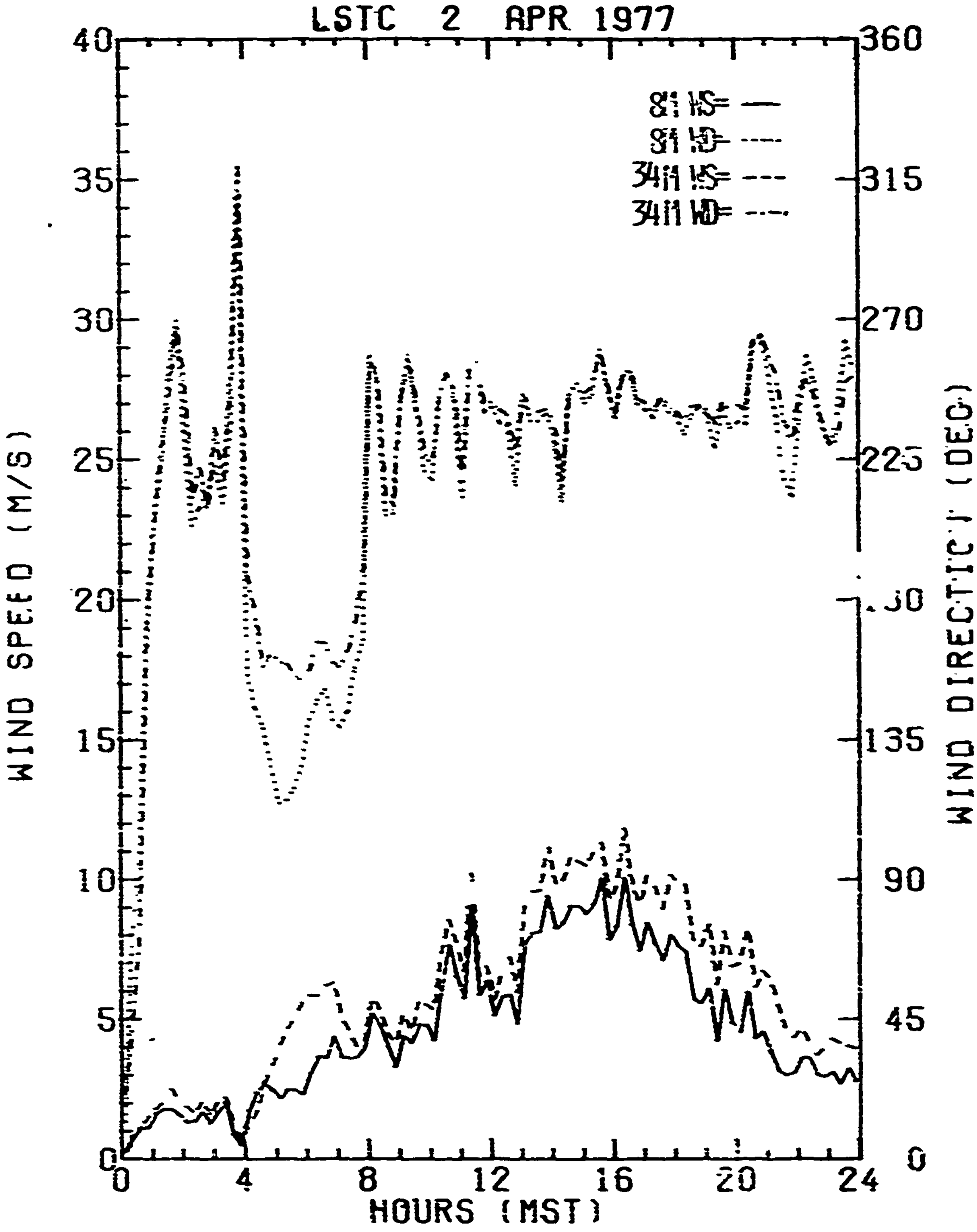


Figure 93. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 2 April 1977.

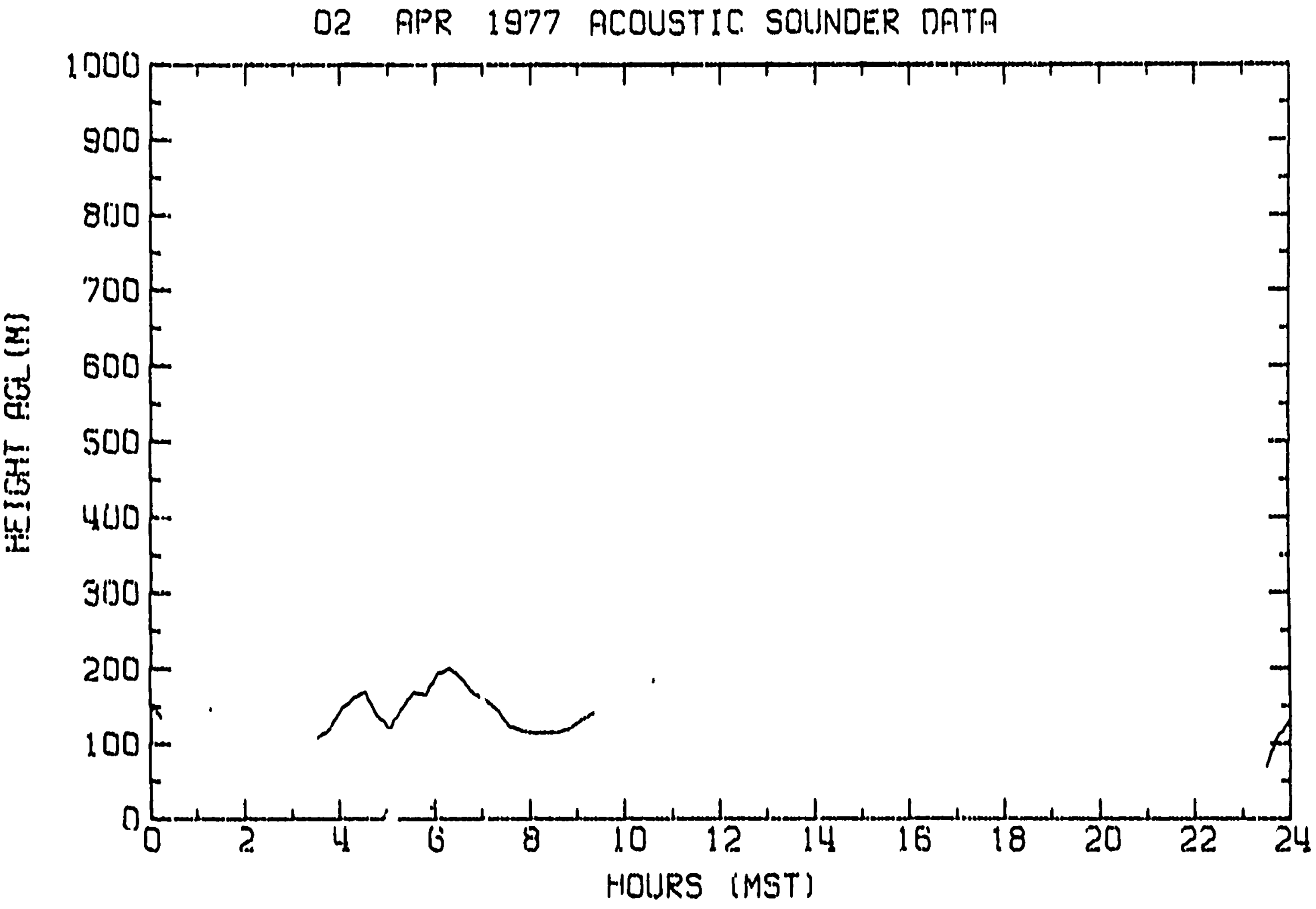


Figure 94. Inversion heights, LSTC, 2 April 1977.

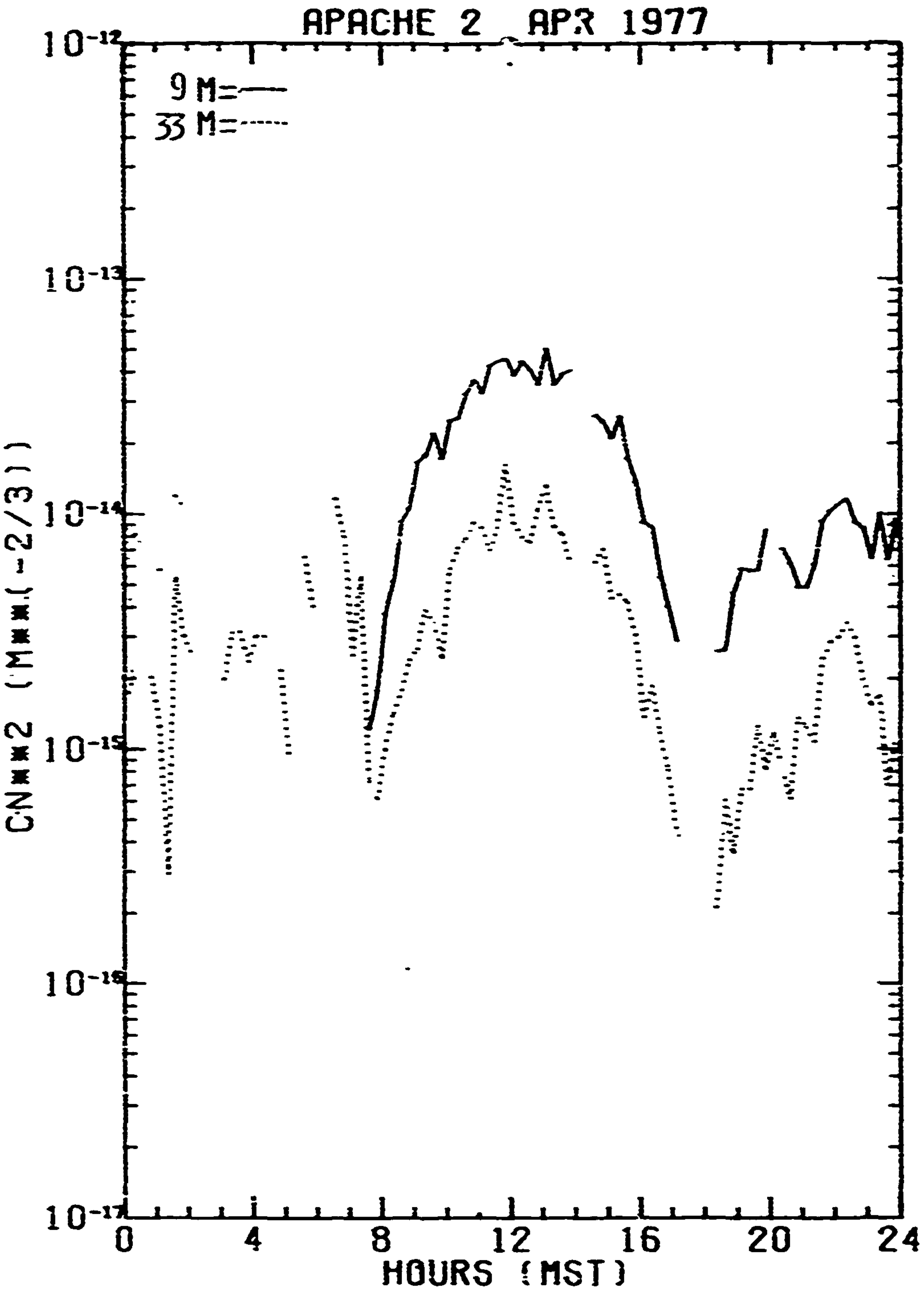


Figure 95. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 2 April 1977.

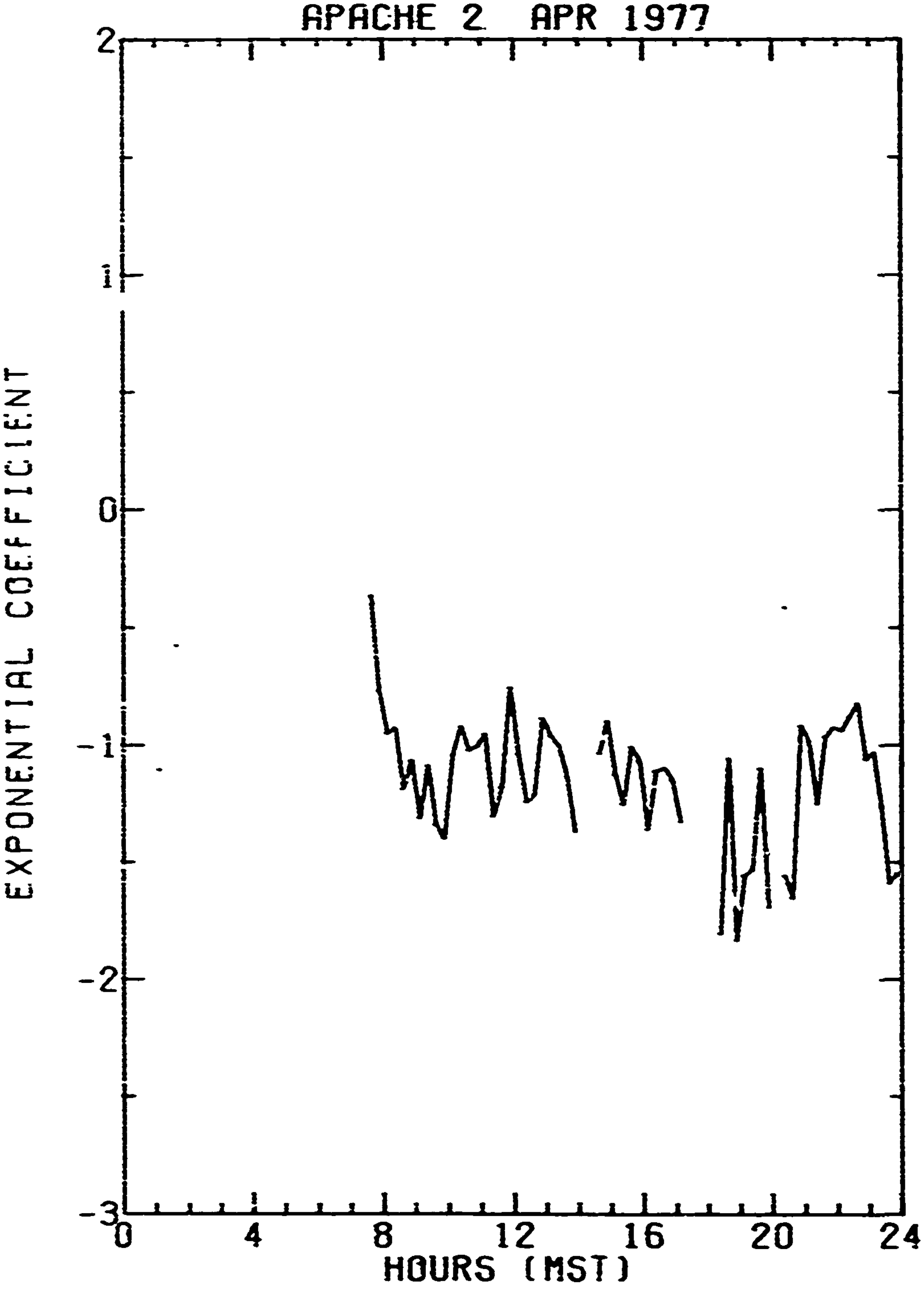


Figure 96. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 2 April 1977.

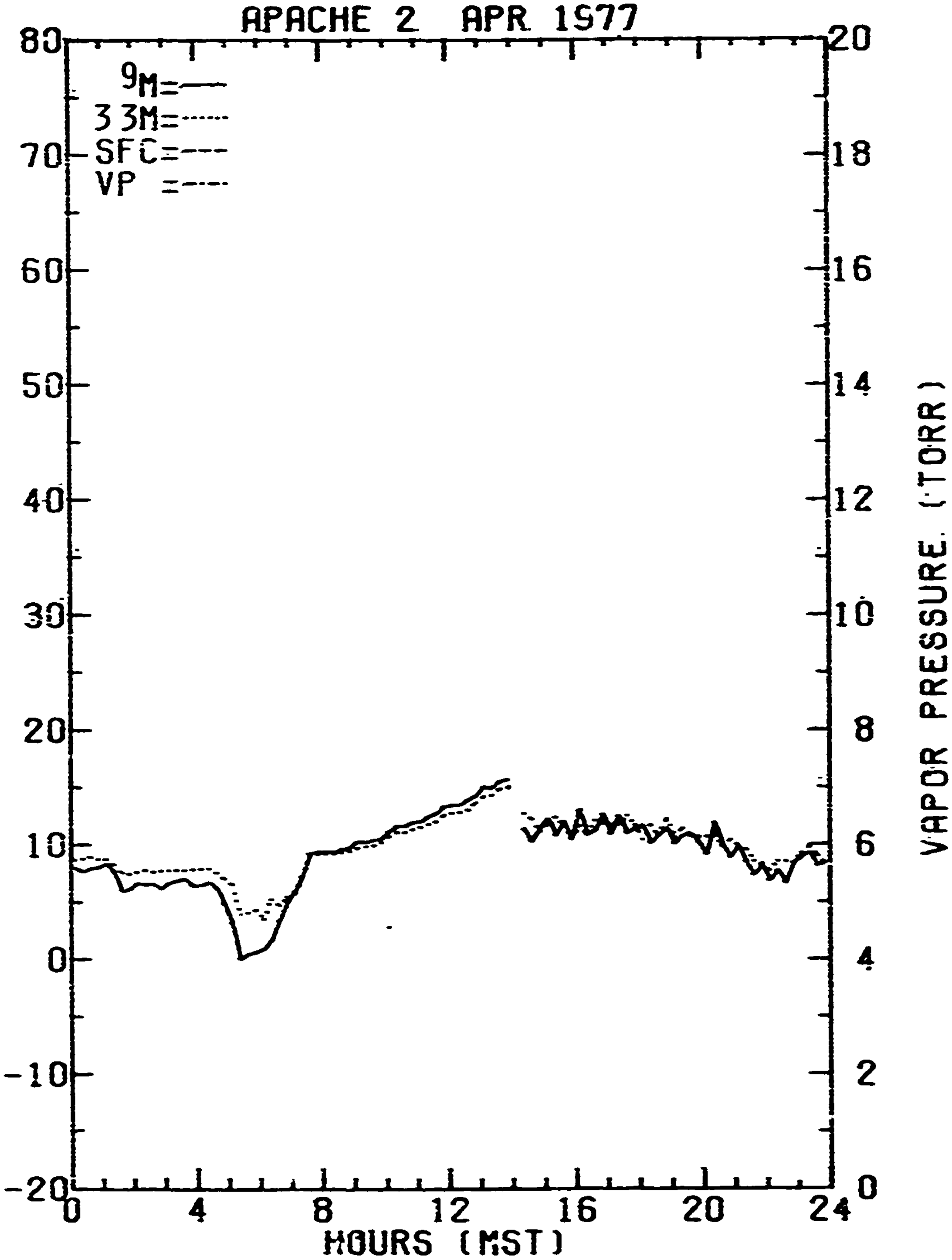


Figure 97. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 2 April 1977.

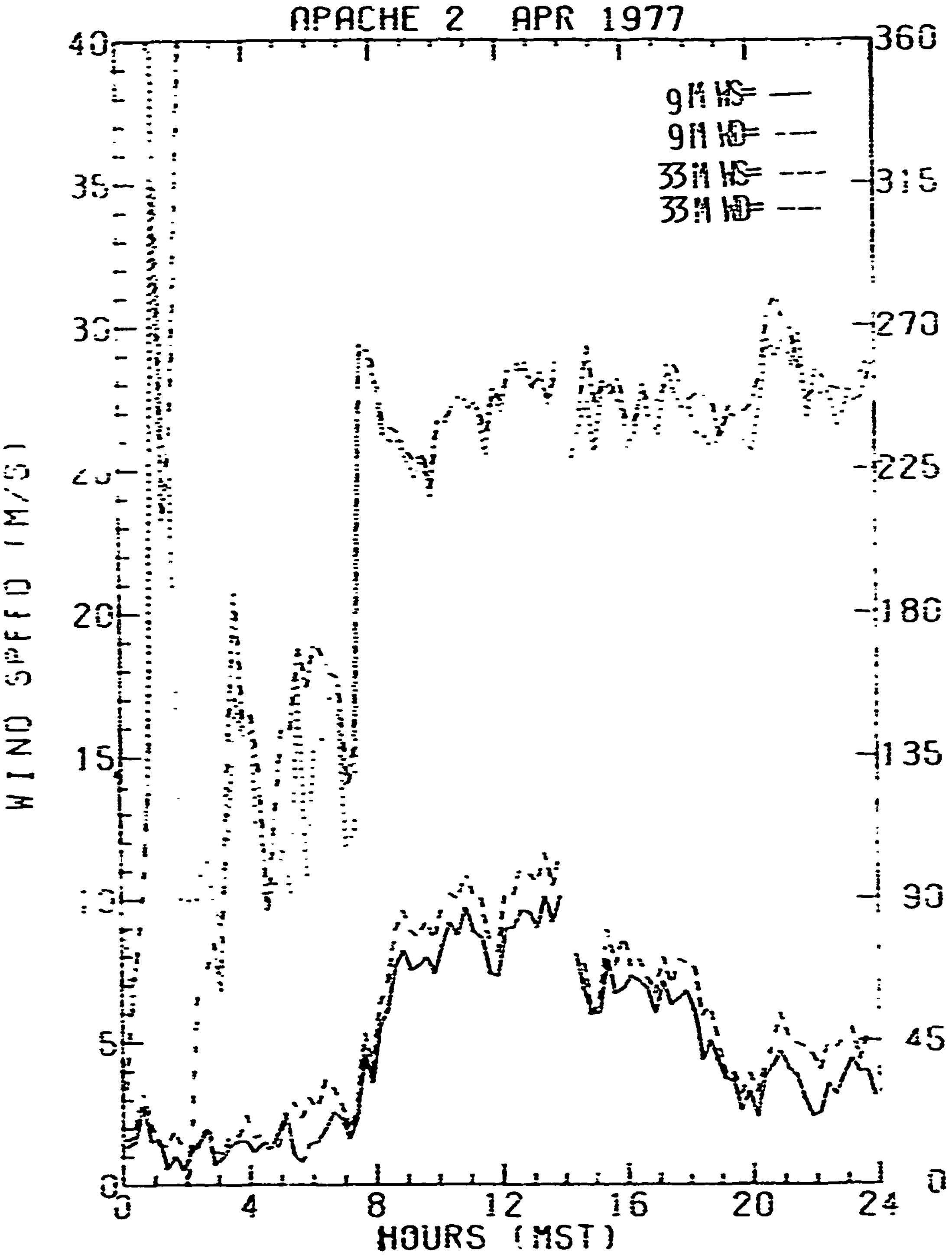


Figure 98. Diurnal variation of windpseed and wind direction at the 9 and 33 m tower levels, Apache Site, 2 April 1977.

TABLE 57
APACHE SITE RAWINSONDE DATA

DATE: 02 APR 77 RELEASE NO.: 30 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.1	6.0	2.4	110.0	3.1
223.7	637.5	6.4	2.3	201.4	3.2
524.3	614.5	4.0	2.1	231.5	7.5
1190.5	565.7	-1.3	1.8	245.5	13.1
1616.3	536.1	-5.7	1.6	249.3	19.4
1780.4	525.0	-6.4	1.3	249.8	22.5
1935.0	514.7	-7.1	0.7	249.5	24.1
2283.2	492.2	-8.4	0.8	247.5	25.8
2746.7	463.7	-8.4	0.5	242.0	27.9
4012.1	392.8	-18.1	0.3	247.4	31.0

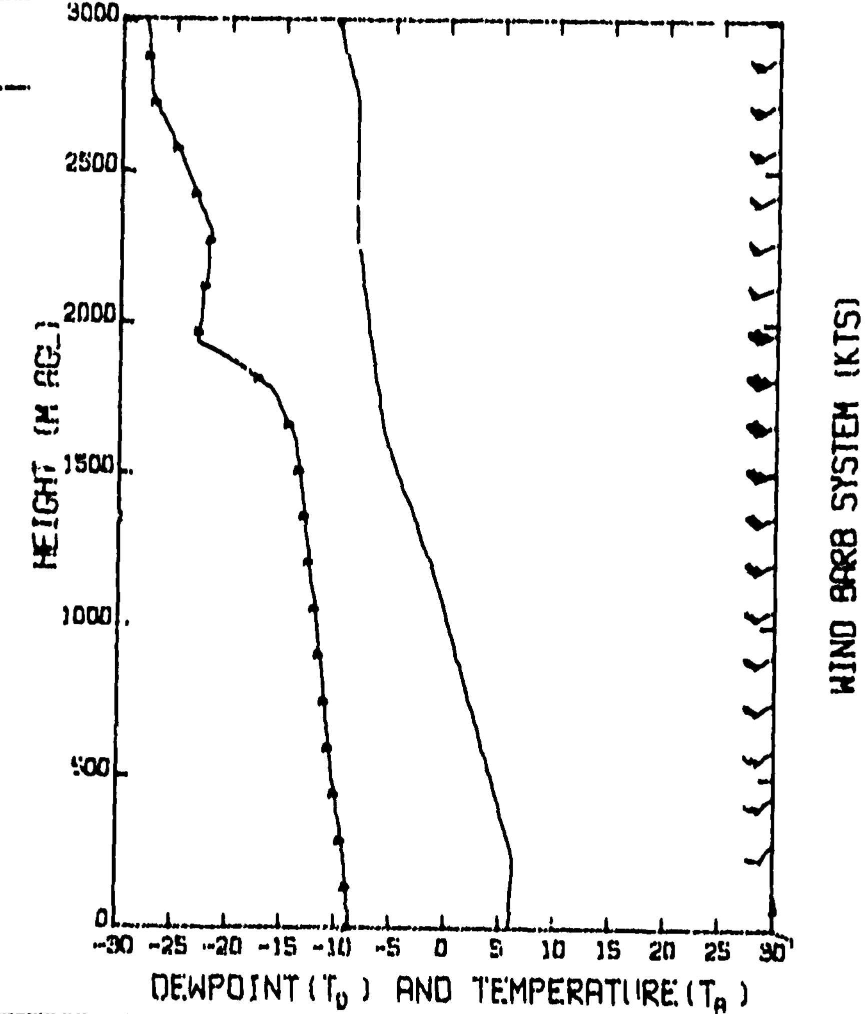


TABLE 58
APACHE SITE RAWINSONDE DATA

DATE: 02 APR 77 RELEASE NO.: 31 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.8	15.8	2.4	240.0	10.3
225.4	637.5	10.6	2.3	238.8	10.8
460.1	619.7	8.3	2.1	237.7	11.4
514.2	615.7	7.6	3.1	237.6	11.5
1800.2	525.0	-4.2	1.5	246.5	14.4
2328.6	490.7	-9.0	1.2	248.9	14.7
2784.6	462.6	-11.1	1.0	255.1	22.8
3038.5	447.6	-10.7	0.7	245.0	30.2

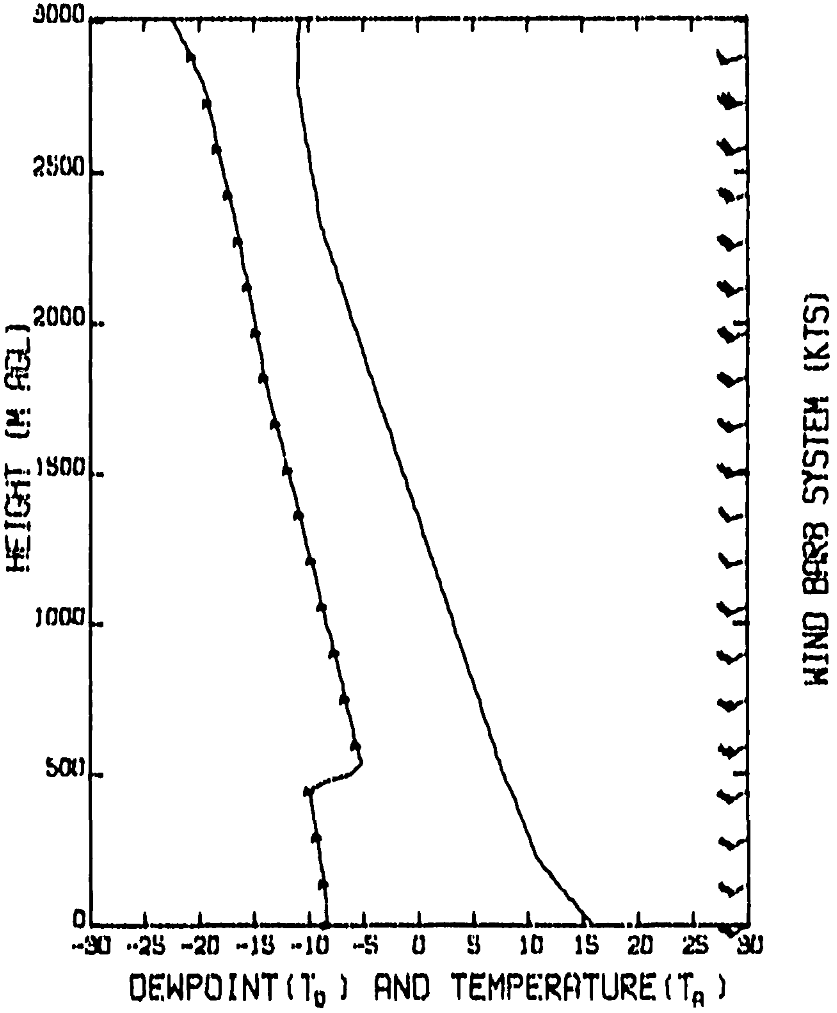


TABLE 59
APACHE SITE RAWINSONDE DATA

DATE: 02 APR 77　　RELEASE NO.: 32　　RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	652.9	17.0	2.6	240.0	11.3
203.0	637.5	14.2	2.5	240.6	11.5
1795.3	525.0	-1.8	1.4	236.8	15.8
3414.0	426.2	-15.5	0.8	237.2	26.9

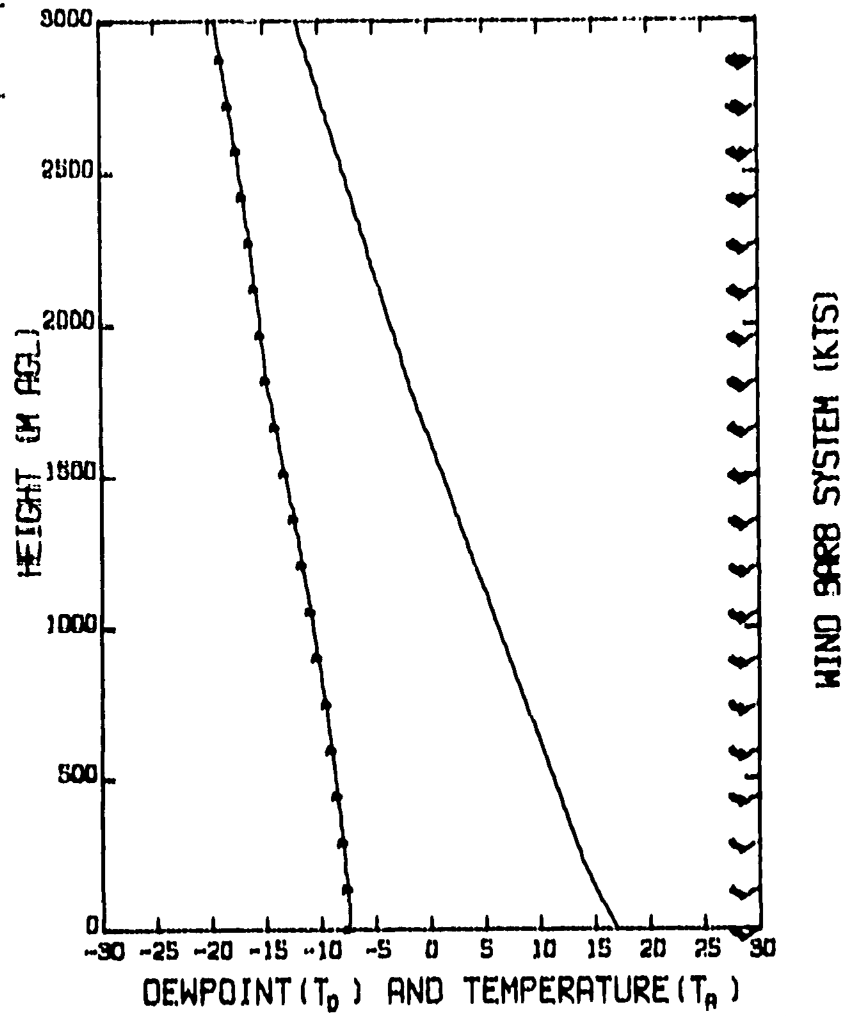
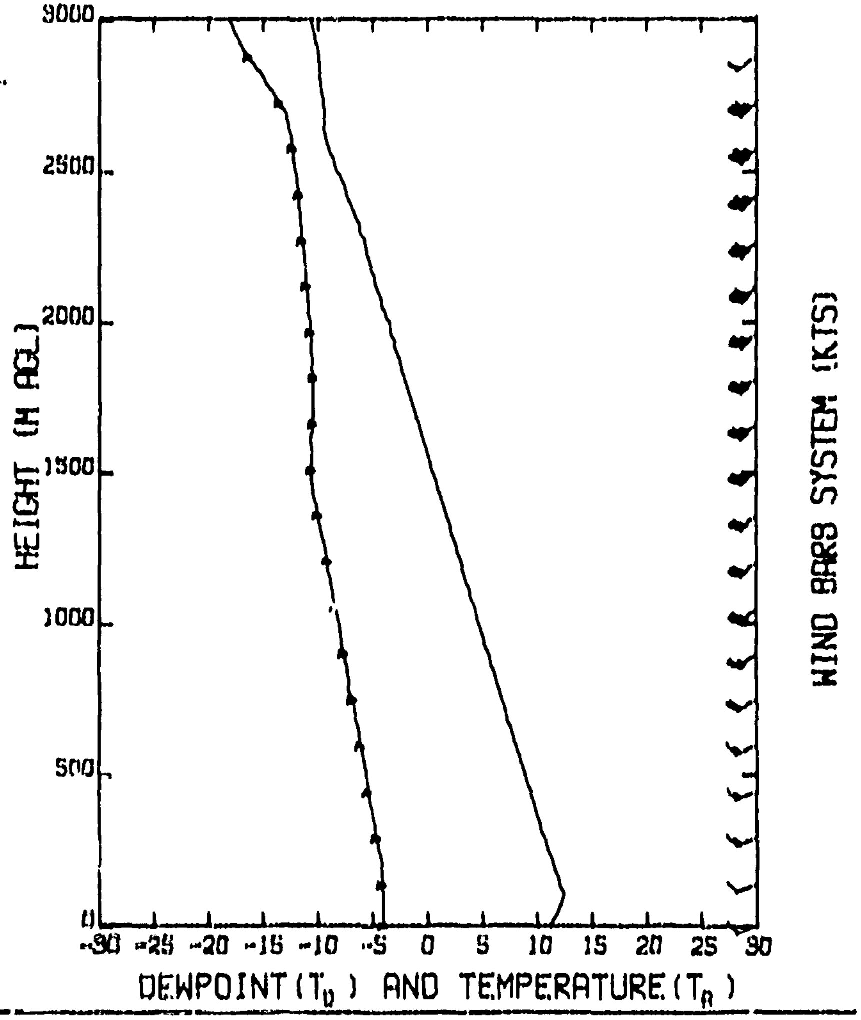


TABLE 60
APACHE SITE RAWINSONDE DATA

DATE: 02 APR 77 RELEASE NO.: 33 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	654.1	11.2	3.4	250.0	5.1
94.6	646.7	12.6	3.4	249.6	5.8
215 0	637.5	11.3	3.3	249.2	6.6
1476.2	546.6	0.7	2.0	224.8	16.8
1799.0	525.0	-2.0	2.1	223.0	17.3
2350.3	489.6	-6.6	1.9	221.3	21.6
2622.3	472.8	-9.5	1.7	225.8	23.2
2691.4	468.6	-9.5	1.7	227.1	23.6
2904.8	455.8	-10.1	1.2	230.9	24.6
3228.1	437.1	-12.1	0.8	234.9	26.3



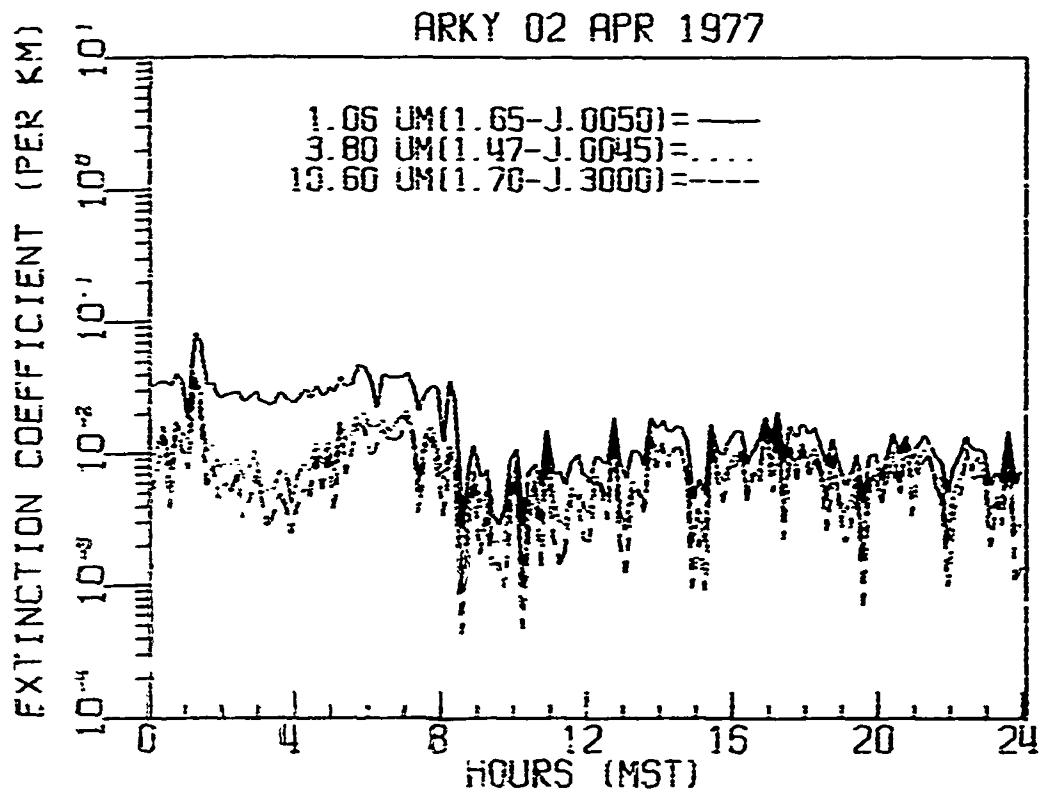


Figure 99. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 2 April 1977.

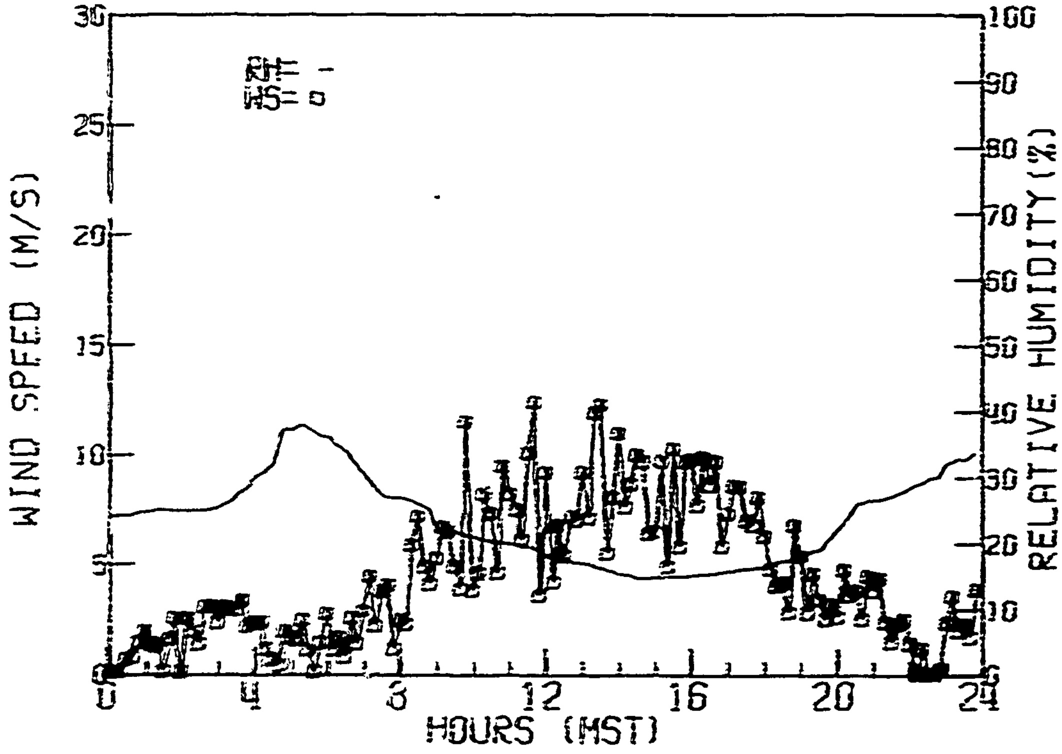


Figure 100. Diurnal variation of windspeed and relative humidity, Arky Site, 2 April 1977.

TABLE 61

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.5	10.6	MASS LOADING (UG/M**3)
02 APR 77														
	00:00:00	600	.63+01	.10+01	.24+00	.15-01	.00	.00	.00	.00	.33-01	.10-01	.55-02	69.
	00:10:00	600	.67+01	.71+00	.21+00	.45-01	.45-01	.00	.00	.00	.35-01	.12-01	.46-02	95.
	00:20:00	600	.65+01	.43-01	.27+00	.76-01	.00	.20-01	.00	.00	.36-01	.16-01	.14-01	172.
	00:30:00	600	.71+01	.75+00	.14+00	.00	.00	.00	.00	.00	.33-01	.75-02	.40-02	61.
	00:40:00	600	.62+01	.69+00	.21+00	.15-01	.14+00	.20-01	.00	.00	.40-01	.18-01	.18-01	171.
	00:50:00	600	.61+01	.74+00	.14+00	.30-01	.00	.20-01	.00	.00	.35-01	.14-01	.11-01	152.
	01:00:00	600	.20+01	.75+00	.43+00	.61-01	.00	.00	.00	.00	.19-01	.13-01	.79-02	67.
	01:10:00	600	.12+02	.17+01	.99+00	.91-01	.95-01	.57-01	.00	.00	.94-01	.41-01	.36-01	429.
	01:20:00	600	.11+02	.17+01	.40+00	.76-01	.96-01	.20-01	.00	.00	.69-01	.29-01	.23-01	247.
	01:30:00	600	.69+01	.88+00	.33+00	.15-01	.00	.00	.00	.00	.35-01	.11-01	.59-02	72.
	01:40:00	600	.61+01	.73+00	.37+00	.15-01	.48-01	.00	.00	.00	.34-01	.12-01	.82-02	76.
	01:50:00	600	.55+01	.56+00	.24+00	.15-01	.00	.00	.00	.00	.27-01	.81-02	.46-02	59.
	02:00:00	600	.53+01	.62+00	.24+00	.00	.48-01	.00	.00	.00	.28-01	.86-02	.62-02	58.
	02:10:00	600	.61+01	.68+00	.12+00	.30-01	.00	.00	.00	.00	.30-01	.84-02	.54-02	69.
	02:20:00	600	.57+01	.73+00	.15+00	.15-01	.48-01	.00	.00	.00	.30-01	.93-02	.70-02	69.
	02:30:00	600	.55+01	.50+00	.21+00	.00	.00	.00	.00	.00	.16-01	.63-02	.54-02	49.
	02:40:00	600	.54+01	.67+00	.21+00	.15-01	.00	.00	.00	.00	.27-01	.83-02	.46-02	58.
	02:50:00	600	.55+01	.77+00	.21+00	.46-01	.00	.00	.00	.00	.30-01	.11-01	.59-02	77.
	03:00:00	600	.54+01	.39+00	.00	.00	.48-01	.00	.00	.00	.25-01	.51-02	.47-02	50.
	03:10:00	600	.53+01	.63+00	.12+00	.00	.00	.00	.00	.00	.24-01	.55-02	.29-02	44.
	03:20:00	600	.54+01	.39+00	.61-01	.15-01	.00	.00	.00	.00	.24-01	.54-02	.35-02	51.
	03:30:00	600	.62+01	.47+00	.91-01	.30-01	.00	.00	.00	.00	.19-01	.75-02	.50-02	67.
	03:40:00	600	.55+01	.69+00	.91-01	.15-01	.00	.00	.00	.00	.27-01	.68-02	.41-02	56.
	03:50:00	600	.57+01	.41+00	.61-01	.00	.00	.00	.00	.00	.25-01	.44-02	.25-02	44.
	04:00:00	600	.57+01	.47+00	.15+00	.15-01	.00	.00	.00	.00	.27-01	.68-02	.41-02	56.
	04:10:00	600	.64+01	.56+00	.15+00	.30-01	.00	.00	.00	.00	.31-01	.95-02	.55-02	73.
	04:20:00	600	.59+01	.47+00	.91-01	.30-01	.00	.00	.00	.00	.28-01	.74-02	.49-02	64.
	04:30:00	600	.63+01	.58+00	.15+00	.15-01	.00	.20-01	.00	.00	.33-01	.12-01	.97-02	140.
	04:40:00	600	.59+01	.43+00	.18+00	.30-01	.00	.00	.00	.00	.29-01	.83-02	.53-02	66.
	04:50:00	600	.54+01	.69+00	.14+00	.15-01	.00	.20-01	.00	.00	.32-01	.12-01	.97-02	139.
	05:00:00	600	.61+01	.84+00	.18+00	.00	.00	.00	.00	.00	.30-01	.75-02	.39-02	56.
	05:10:00	600	.57+01	.59+00	.14+00	.00	.45-01	.37-01	.00	.00	.38-01	.18-01	.17-01	222.
	05:20:00	600	.59+01	.84+00	.46+00	.30-01	.00	.00	.00	.00	.33-01	.13-01	.72-02	78.
	05:30:00	600	.57+01	.71+00	.33+00	.51-01	.45-01	.00	.00	.00	.34-01	.15-01	.11-01	99.
	05:40:00	600	.77+01	.11+01	.33+00	.61-01	.48-01	.20-01	.00	.00	.48-01	.21-01	.17-01	196.
	05:50:00	600	.74+01	.94+00	.47+00	.30-01	.45-01	.20-01	.00	.00	.46-01	.20-01	.16-01	179.
	06:00:00	600	.63+01	.86+00	.43+00	.76-01	.00	.00	.00	.00	.37-01	.16-01	.10-01	105.
	06:10:00	600	.22+01	.92+00	.27+00	.12+00	.00	.00	.00	.00	.23-01	.17-01	.12-01	101.
	06:20:00	600	.68+01	.64-01	.52+00	.46-01	.48-01	.20-01	.00	.00	.40-01	.18-01	.15-01	173.
	06:30:00	600	.67+01	.71+00	.12+00	.30-01	.45-01	.20-01	.00	.00	.38-01	.15-01	.13-01	163.
	06:40:00	600	.64+01	.75+00	.40+00	.76-01	.48-01	.00	.00	.00	.38-01	.17-01	.13-01	112.

TABLE 61 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
02 APR 77														
	06:50:00	600	.58+01	.88+00	.52+00	.46-01	.00	.20-01	.00	.00	.39-01	.19-01	.14-01	168.
	07:00:00	600	.62+01	.98+00	.24+00	.46-01	.49-01	.39-01	.00	.00	.42-01	.22-01	.20-01	249.
	07:10:00	600	.51+01	.56+00	.21+00	.30-01	.48-01	.20-01	.00	.00	.32-01	.15-01	.13-01	152.
	07:20:00	600	.43+01	.59+00	.12+00	.15-01	.00	.00	.00	.00	.22-01	.53-02	.37-02	47.
	07:30:00	600	.45+01	.64+00	.33+00	.30-01	.96-01	.00	.00	.00	.29-01	.13-01	.11-01	81.
	07:40:00	600	.51+01	.49+00	.37+00	.30-01	.49-01	.20-01	.00	.00	.33-01	.15-01	.14-01	155.
	07:50:00	600	.58+01	.71+00	.27+00	.15-01	.48-01	.00	.00	.00	.32-01	.11-01	.76-02	72.
	08:00:00	600	.15+01	.77+00	.19+00	.15-01	.00	.00	.00	.00	.13-01	.55-02	.35-02	33.
	08:10:00	600	.70+01	.56+00	.61-01	.61-01	.48-01	.00	.00	.00	.36-01	.12-01	.98-02	98.
	08:20:00	600	.45+01	.24+00	.30-01	.00	.00	.20-01	.00	.00	.24-01	.75-02	.71-02	115.
	08:30:00	600	.49+00	.11+00	.30-01	.00	.00	.00	.00	.00	.27-02	.92-03	.44-03	5.
	08:40:00	600	.89+00	.45+00	.91-01	.15-01	.00	.00	.00	.00	.76-02	.41-02	.24-02	22.
	08:50:00	600	.99+00	.47+00	.91-01	.15-01	.96-01	.00	.00	.00	.12-01	.74-02	.75-02	41.
	09:00:00	600	.62+00	.55+00	.15+00	.00	.00	.00	.00	.00	.59-02	.39-02	.17-02	15.
	09:10:00	600	.67+00	.45+00	.91-01	.30-01	.00	.00	.00	.00	.76-02	.52-02	.34-02	29.
	09:20:00	600	.43+00	.13+00	.30-01	.15-01	.00	.00	.00	.00	.35-02	.21-02	.15-02	14.
	09:30:00	600	.23+00	.17+00	.30-01	.15-01	.00	.00	.00	.00	.29-02	.22-02	.15-02	13.
	09:40:00	600	.44+00	.19+00	.12+00	.00	.00	.00	.00	.00	.38-02	.22-02	.10-02	9.
	09:50:00	600	.13+01	.19+00	.15+00	.30-01	.00	.00	.00	.00	.91-02	.53-02	.35-02	32.
	10:00:00	600	.60+00	.29+00	.12+00	.00	.49-01	.20-01	.00	.00	.11-01	.89-02	.59-02	100.
	10:10:00	600	.50+00	.13+00	.30-01	.00	.00	.00	.00	.00	.29-02	.10-02	.48-03	6.
	10:20:00	600	.90+00	.28+00	.15+00	.15-01	.00	.00	.00	.00	.72-02	.42-02	.24-02	22.
	10:30:00	600	.73+00	.13+00	.91-01	.00	.00	.20-01	.00	.00	.85-02	.64-02	.61-02	89.
	10:40:00	600	.83+00	.21+00	.14+00	.00	.00	.00	.00	.00	.59-02	.31-02	.14-02	12.
	10:50:00	600	.12+01	.41+00	.91-01	.30-01	.48-01	.20-01	.00	.00	.15-01	.11-01	.11-01	122.
	11:00:00	600	.92+00	.24+00	.14+00	.15-01	.00	.00	.00	.00	.72-02	.44-02	.25-02	22.
	11:10:00	600	.12+01	.26+00	.15+00	.00	.00	.00	.00	.00	.74-02	.31-02	.15-02	15.
	11:20:00	600	.89+00	.19+00	.61-01	.15-01	.00	.00	.00	.00	.59-02	.29-02	.19-02	15.
	11:30:00	600	.90+00	.24+00	.15+00	.15-01	.48-01	.00	.00	.00	.87-02	.57-02	.49-02	30.
	11:40:00	600	.11+01	.36+00	.12+00	.15-01	.49-01	.00	.00	.00	.10-01	.59-02	.50-02	32.
	11:50:00	600	.82+00	.36+00	.12+00	.15-01	.00	.00	.00	.00	.71-02	.42-02	.24-02	21.
	12:00:00	600	.71+00	.32+00	.91-01	.15-01	.00	.00	.00	.00	.62-02	.35-02	.21-02	20.
	12:10:00	600	.73+00	.39+00	.61-01	.00	.00	.20-01	.00	.00	.97-02	.70-02	.63-02	92.
	12:20:00	600	.10+01	.19+00	.61-01	.30-01	.49-01	.00	.00	.00	.90-02	.57-02	.55-02	37.
	12:30:00	600	.12+01	.26+00	.91-01	.30-01	.00	.00	.00	.00	.85-02	.47-02	.32-02	30.
	12:40:00	600	.11+01	.41+00	.61-01	.61-01	.00	.39-01	.00	.00	.19-01	.15-01	.16-01	209.
	12:50:00	600	.12+01	.41+00	.61-01	.15-01	.00	.00	.00	.00	.85-02	.38-02	.23-02	24.
	13:00:00	600	.99+00	.36+00	.91-01	.00	.00	.00	.00	.00	.66-02	.27-02	.13-02	13.
	13:10:00	600	.10+01	.51+00	.12+00	.15-01	.48-01	.00	.00	.00	.11-01	.64-02	.52-02	34.
	13:20:00	600	.13+01	.32+00	.00	.30-01	.49-01	.00	.00	.00	.11-01	.55-02	.55-02	39.
	13:30:00	600	.10+01	.32+00	.91-01	.00	.48-01	.00	.00	.00	.84-02	.42-02	.37-02	22.

TABLE 61 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
		1	2	3	4	5	6	7	8	1.06	3.8	10.6	
02 APR 77													
13:40:00	600	.14+01	.49+00	.27+00	.46-01	.48-01	.20-01	.00	.00	.19-01	.15-01	.13-01	137.
13:50:00	600	.17+01	.60+00	.21+00	.46-01	.49-01	.00	.00	.00	.16-01	.13-01	.90-02	59.
14:00:00	600	.17+01	.54+00	.18+00	.61-01	.96-01	.00	.00	.00	.18-01	.12-01	.11-01	75.
14:10:00	600	.15+01	.43+00	.15+00	.15-01	.00	.20-01	.00	.00	.15-01	.95-02	.91-02	109.
14:20:00	600	.16+01	.26+00	.91-01	.30-01	.48-01	.20-01	.00	.00	.16-01	.11-01	.11-01	123.
14:30:00	600	.12+01	.54+00	.15+00	.15-01	.49-01	.20-01	.00	.00	.16-01	.12-01	.11-01	117.
14:40:00	600	.14+01	.39+00	.61-01	.15-01	.96-01	.00	.00	.00	.13-01	.69-02	.74-02	42.
14:50:00	600	.75+00	.13+00	.12+00	.00	.00	.00	.00	.00	.17-02	.21-02	.10-02	9.
15:00:00	600	.84+00	.19+00	.15+00	.15-01	.00	.00	.00	.00	.64-02	.39-02	.23-02	20.
15:10:00	600	.65+00	.32+00	.61-01	.00	.00	.00	.00	.00	.53-02	.21-02	.76-03	10.
15:20:00	600	.10+01	.32+00	.21+00	.30-01	.96-01	.20-01	.00	.00	.17-01	.14-01	.14-01	131.
15:30:00	600	.82+00	.34+00	.15+00	.00	.00	.20-01	.00	.00	.11-01	.79-02	.57-02	94.
15:40:00	600	.11+01	.41+00	.91-01	.46-01	.00	.00	.00	.00	.10-01	.64-02	.45-02	80.
15:50:00	600	.12+01	.39+00	.14+00	.15-01	.95-01	.00	.00	.00	.13-01	.82-02	.79-02	44.
16:00:00	600	.14+01	.62+00	.91-01	.61-01	.48-01	.00	.00	.00	.15-01	.10-01	.84-02	63.
16:10:00	600	.12+01	.41+00	.12+00	.15-01	.49-01	.20-01	.00	.00	.15-01	.11-01	.10-01	114.
16:20:00	600	.95+00	.32+00	.61-01	.15-01	.48-01	.00	.00	.00	.87-02	.50-02	.46-02	70.
16:30:00	600	.13+01	.32+00	.00	.15-01	.00	.20-01	.00	.00	.11-01	.73-02	.70-02	100.
16:40:00	600	.16+01	.45+00	.15+00	.30-01	.48-01	.00	.00	.00	.13-01	.79-02	.64-02	46.
16:50:00	600	.11+01	.36+00	.91-01	.61-01	.00	.30-01	.00	.00	.19-01	.15-01	.16-01	209.
17:00:00	600	.14+01	.49+00	.21+00	.46-01	.00	.00	.00	.00	.13-01	.82-02	.53-02	46.
17:10:00	600	.12+01	.45+00	.24+00	.61-01	.00	.30-01	.00	.00	.21-01	.19-01	.17-01	214.
17:20:00	600	.14+01	.32+00	.91-01	.15-01	.00	.00	.00	.00	.89-02	.39-02	.24-02	24.
17:30:00	600	.15+01	.39+00	.91-01	.30-01	.49-01	.20-01	.00	.00	.16-01	.12-01	.11-01	123.
17:40:00	600	.16+01	.45+00	.18+00	.30-01	.48-01	.00	.00	.00	.14-01	.82-02	.66-02	47.
17:50:00	600	.14+01	.41+00	.27+00	.15-01	.49-01	.20-01	.00	.00	.17-01	.12-01	.11-01	119.
18:00:00	600	.17+01	.41+00	.18+00	.00	.00	.20-01	.00	.00	.15-01	.88-02	.72-02	101.
18:10:00	600	.14+01	.62+00	.12+00	.30-01	.00	.20-01	.00	.00	.16-01	.11-01	.72-02	119.
18:20:00	600	.98+00	.41+00	.18+00	.00	.00	.20-01	.00	.00	.12-01	.85-02	.70-02	96.
18:30:00	600	.13+01	.41+00	.15+00	.15-01	.00	.00	.00	.00	.54-02	.47-02	.27-02	24.
18:40:00	600	.90+00	.36+00	.18+00	.00	.48-01	.20-01	.00	.00	.13-01	.99-02	.94-02	104.
18:50:00	600	.94+00	.26+00	.61-01	.15-01	.49-01	.00	.00	.00	.53-02	.47-02	.45-02	29.
19:00:00	600	.74+00	.21+00	.12+00	.15-01	.00	.00	.00	.00	.59-02	.36-02	.21-02	19.
19:10:00	600	.77+00	.34+00	.61-01	.30-01	.00	.00	.00	.00	.71-02	.46-02	.31-02	29.
19:20:00	600	.81+00	.32+00	.18+00	.30-01	.48-01	.00	.00	.00	.10-01	.74-02	.62-02	40.
19:30:00	600	.65+00	.28+00	.30-01	.00	.00	.00	.00	.00	.43-02	.16-02	.74-03	9.
19:40:00	600	.65+00	.45+00	.12+00	.00	.96-01	.00	.00	.00	.97-02	.64-02	.65-02	31.
19:50:00	600	.78+00	.36+00	.91-01	.00	.00	.20-01	.00	.00	.13-01	.72-02	.54-02	92.
20:00:00	600	.52+00	.37+00	.91-01	.15-01	.48-01	.00	.00	.00	.64-02	.46-02	.44-02	25.
20:10:00	600	.61+00	.39+00	.91-01	.15-01	.95-01	.00	.00	.00	.98-02	.70-02	.73-02	39.
20:20:00	600	.13+01	.62+00	.18+00	.76-01	.00	.00	.00	.00	.14-01	.11-01	.74-02	64.

TABLE 61 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
02 APR 77													
20:30:00	600	.11+01	.34+00	.15+00	.15-01	.48-01	.00	.00	.00	.10-01	.61-02	.51-02	33.
20:40:00	600	.81+00	.36+00	.91-01	.30-01	.48-01	.20-01	.00	.00	.14-01	.11-01	.11-01	119.
20:50:00	600	.10+01	.26+00	.37+00	.15-01	.00	.00	.00	.00	.93-02	.66-02	.35-02	27.
21:00:00	600	.11+01	.26+00	.12+00	.61-01	.48-01	.00	.00	.00	.12-01	.90-02	.40-02	56.
21:10:00	600	.11+01	.39+00	.15+00	.76-01	.48-01	.00	.00	.00	.14-01	.11-01	.93-02	68.
21:20:00	600	.81+00	.39+00	.30-01	.15-01	.48-01	.20-01	.00	.00	.12-01	.94-02	.38-02	109.
21:30:00	600	.10+01	.19+00	.15+00	.30-01	.48-01	.00	.00	.00	.97-02	.67-02	.59-02	39.
21:40:00	600	.67+00	.36+00	.15+00	.46-01	.00	.00	.00	.00	.88-02	.50-02	.46-02	35.
21:50:00	600	.82+00	.24+00	.91-01	.00	.00	.00	.00	.00	.53-02	.22-02	.10-02	11.
22:00:00	600	.93+00	.32+00	.30-01	.46-01	.00	.00	.00	.00	.82-02	.54-02	.40-02	37.
22:10:00	600	.10+01	.39+00	.18+00	.15-01	.48-01	.00	.00	.00	.10-01	.66-02	.53-02	33.
22:20:00	600	.11+01	.26+00	.30-01	.00	.95-01	.20-01	.00	.00	.14-01	.95-02	.11-01	112.
22:30:00	600	.95+00	.34+00	.15+00	.00	.00	.20-01	.00	.00	.11-01	.79-02	.67-02	95.
22:40:00	600	.71+00	.39+00	.19+00	.76-01	.00	.00	.00	.00	.11-01	.95-02	.69-02	56.
22:50:00	600	.90+00	.26+00	.17+00	.46-01	.48-01	.00	.00	.00	.10-01	.77-02	.69-02	47.
23:00:00	600	.78+00	.28+00	.91-01	.15-01	.00	.00	.00	.00	.53-02	.35-02	.21-02	19.
23:10:00	600	.59+00	.32+00	.61-01	.15-01	.48-01	.00	.00	.00	.73-02	.48-02	.45-02	27.
23:20:00	600	.77+00	.17+00	.91-01	.30-01	.00	.00	.00	.00	.64-02	.43-02	.30-02	26.
23:30:00	600	.77+00	.26+00	.30-01	.00	.48-01	.39-01	.00	.00	.15-01	.12-01	.14-01	179.
23:40:00	600	.82+00	.43+00	.61-01	.00	.00	.00	.00	.00	.61-02	.23-02	.11-02	12.
23:50:00	600	.11+01	.45+00	.91-01	.00	.00	.00	.00	.00	.74-02	.30-02	.14-02	15.

Weather Summary

Date: 3 April 1977

Synoptic

Surface: Weak surface low-pressure area developed over central New Mexico and moved slowly eastward.

500 Millibar: Northeast-southwest oriented trough thru northeastern Arizona moving rapidly eastward with generally strong southwesterly flow over New Mexico.

Holloman AFB

Clouds: Mostly low (cumulus) and middle (altocumulus) cloudiness at 18C m and 3000 m AGL, respectively, becoming partly cloudly after 1900 MST.

Wind: Generally southwesterly at 5-10 m sec^{-1} with peak gust of 15 m sec^{-1} from the southwest near noon decreasing thru the afternoon to northwesterly at 4 m sec^{-1} by 1600 MST.

Visibility. Generally greater than 30 km.

Maximum temperature:	13.9°C	Corresponding vapor pressure:	2.7 Torr
Minimum temperature:	6.1°C	Corresponding vapor pressure:	4.0 Torr

Figure 101a. Surface weather map for 3 April 1977.

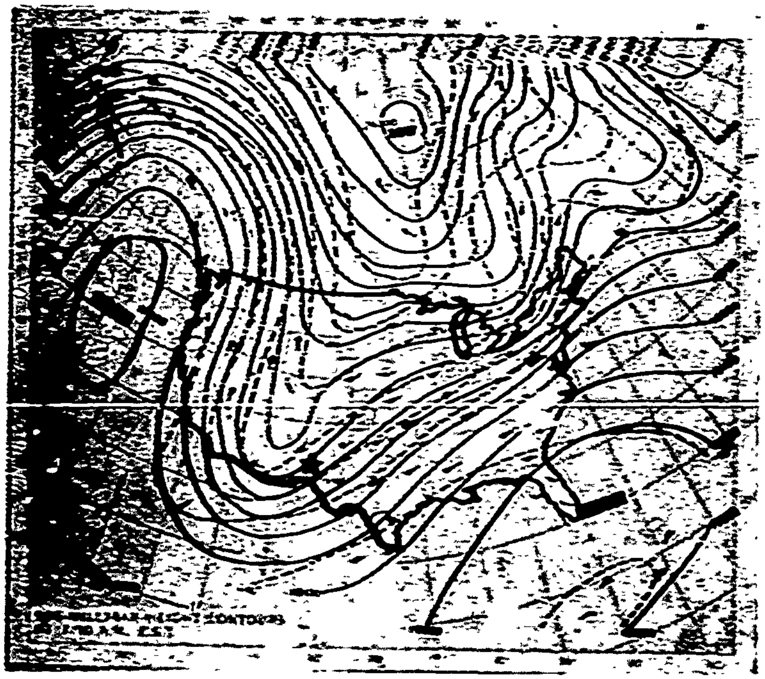


Figure 101b. 500-millibar height contours for 3 April 1977.

TABLE 62. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 3 April 1977 Remarks
0100	7.7	3.2	-4.8	0	50 Ac	0	0030 - plane observed - checked acoustic sounder
0200	9.0	3.2	-4.6	0	90 Ac	0	
0300	7.0	4.7	.3	0	20 Ac	0	
0400	6.9	4.6	.2	0	30 Ac	0	
0500	6.5	4.6	0.0	0	90 Ac	0	0445 - plane observed
0600	5.9	2.9	-6.0	0	90 Ac	0	
0700	6.1	2.5	-7.9	0	80 Ac	0	0730 - replaced broken 8 m u at Apache - still looks bad
0800	6.9	2.4	-8.5	0	70 Ac	30 Ci	
0900	8.0	2.8	-6.5	80 Sc	0	20 Ci	
1000	9.9	2.6	-7.4	30 Sc	30 Ac	10 Ci	Possible cumulonimbus S
1100	12.2	1.8	-12.3	70 Cu	05 Ac	0	Possible cumulonimbus S
1200	13.8	2.5	-8.2	30 Cu	0	0	32 m "T" has spikes in high wind - suspect a defective probe
1300	13.5	3.0	-5.5	60 Cu	0	0	Towering Cu SW-NW
1400	12.1	2.5	-7.9	90 Sc	0	0	Towering Cu SW-NW
1500	13.0	2.7	-6.9	40 Cu	0	0	CB NW, N/towering Cu SW-NW, NE-E/rain showers NW/dissipated Cb's S
1600	12.3	2.6	-7.5	50 Cb	0	0	CB W, NW, N-E/rain showers NW, NE/virga W/towering Cu SW
1700	11.8	2.4	-8.1	90 Cb	0	0	CB SW-N-SE and overhead/snow showers NW, E/virga N, S, E overhead
1800							Snow showers began 1715 (strong thermal activity noted on ΔT at 32m level only)
1900							Snow showers ended 1745
1800	9.0	2.9	-5.9	90 Cb	10 Ac	-	Cb all quads snow showers NW-SW, NE-SE virga N,S; breaks in overcast N, S
1900	8.9	2.2	-9.8	40 Cu	50 Ac	0	Cb SE, SW rain showers SE, SW, lightning cloud to ground SE
2000	7.7	2.5	-7.9	30 Sc	70 Ac	0	
2100	8.3	2.3	-9.3	10 Sc	90 Ac	0	
2200	5.3	2.3	-9.0	0	30 Ac	60 Ci	(thin)
2300	3.5	3.5	-3.6	0	20 Ac	20 Ci	(thin)
2400	3.5	9.5	-3.6	0	20 Ac		

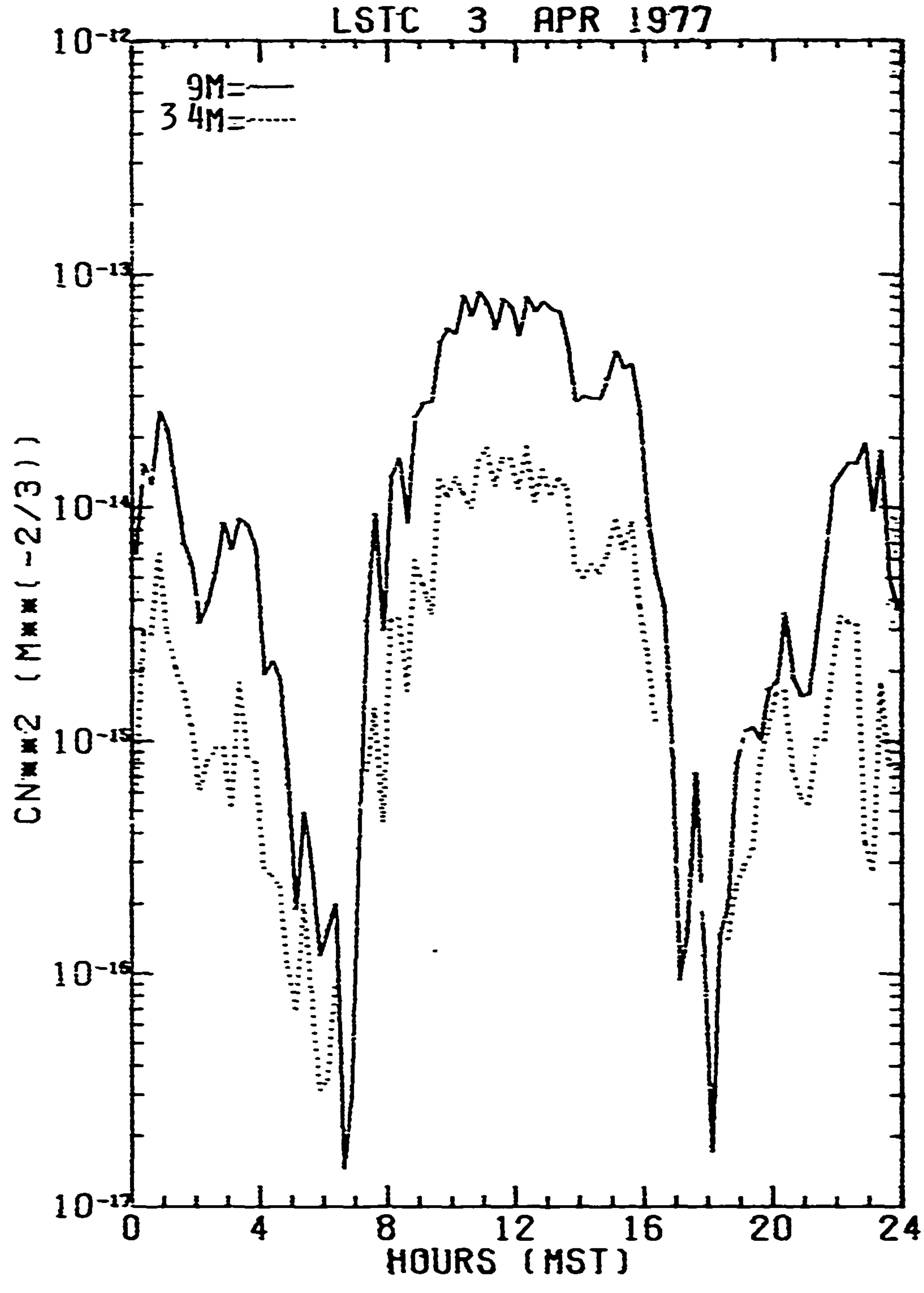


Figure 102. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 3 April 1977.

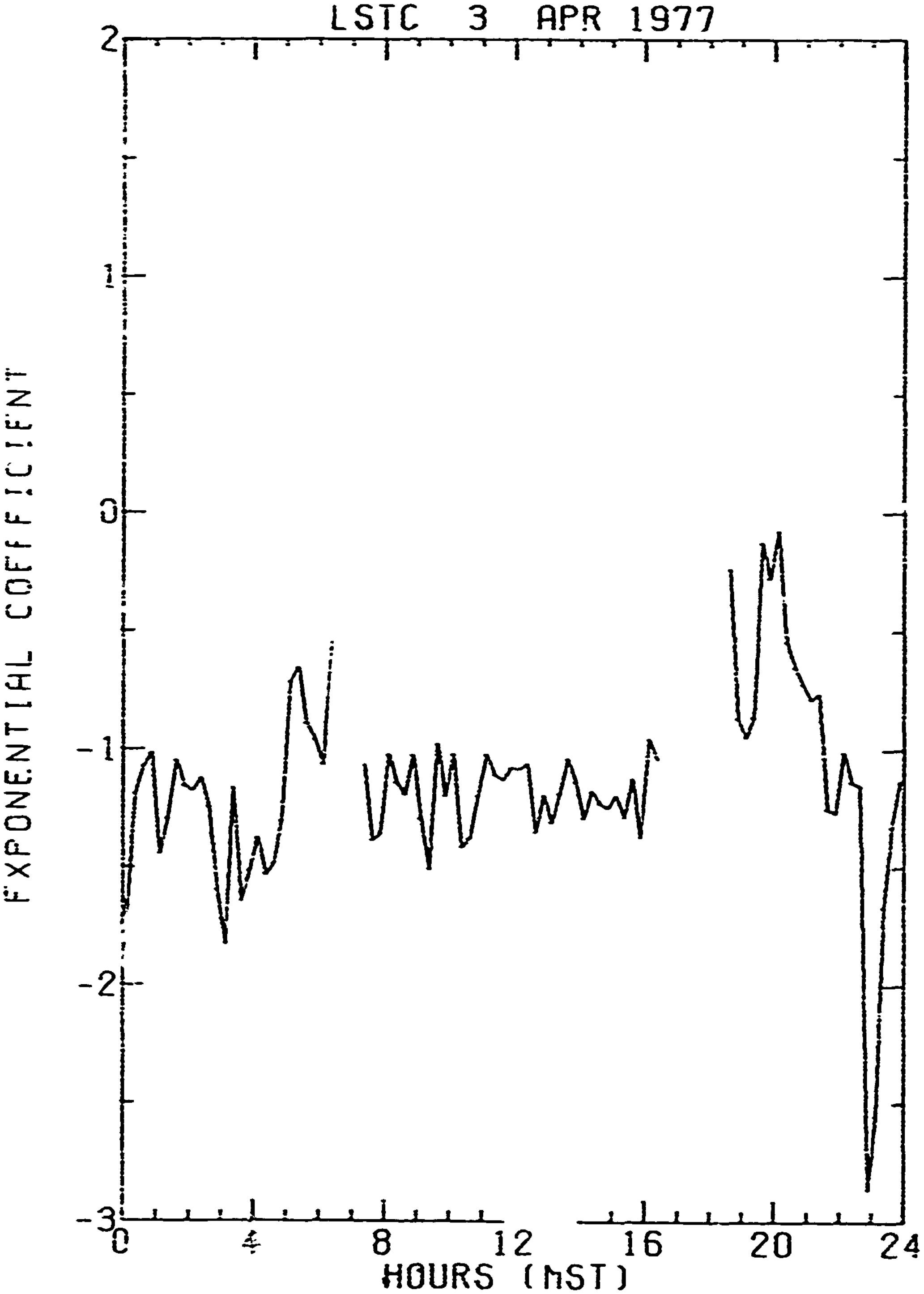


Figure 103. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 3 April 1977.

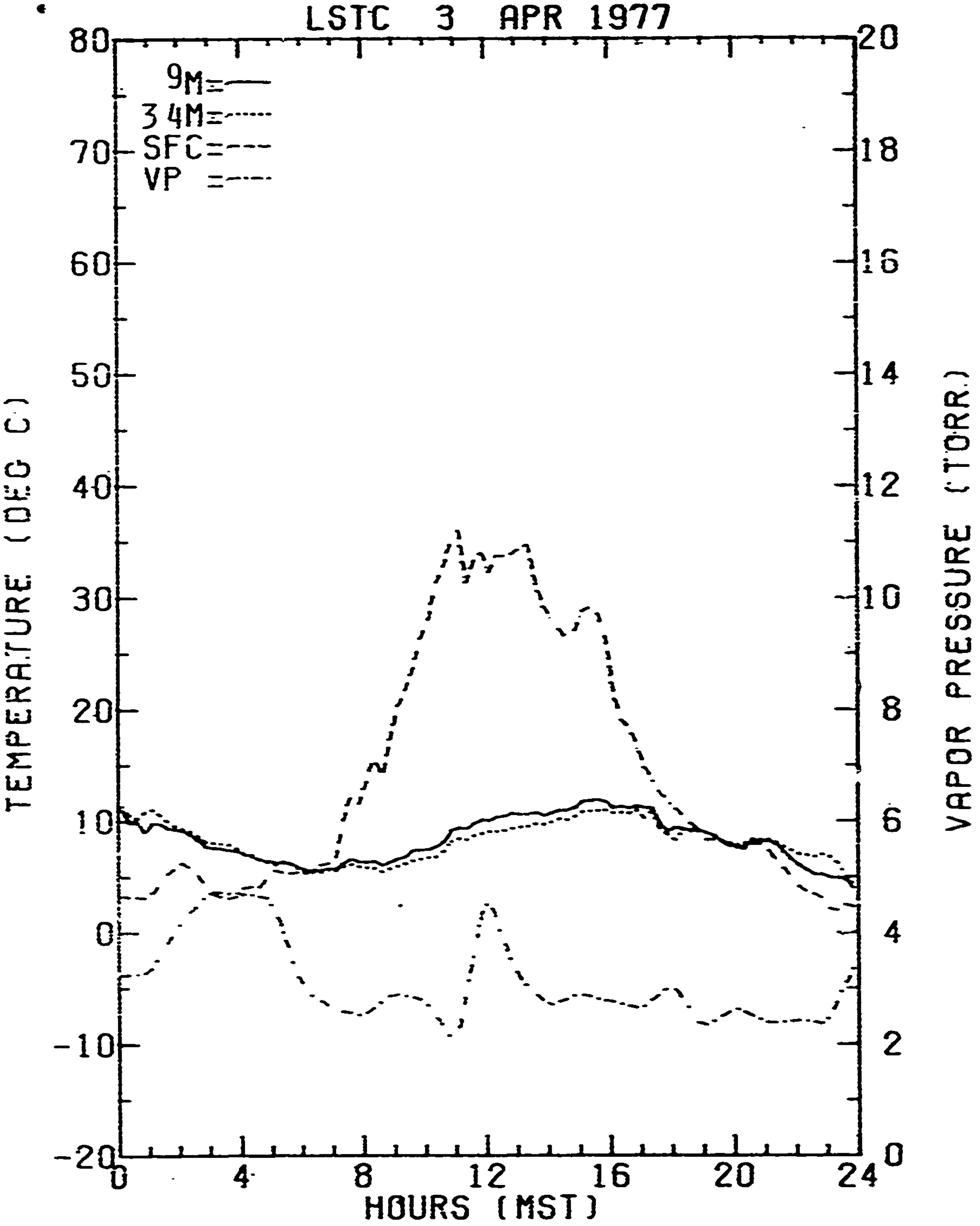


Figure 104. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 3 April 1977.

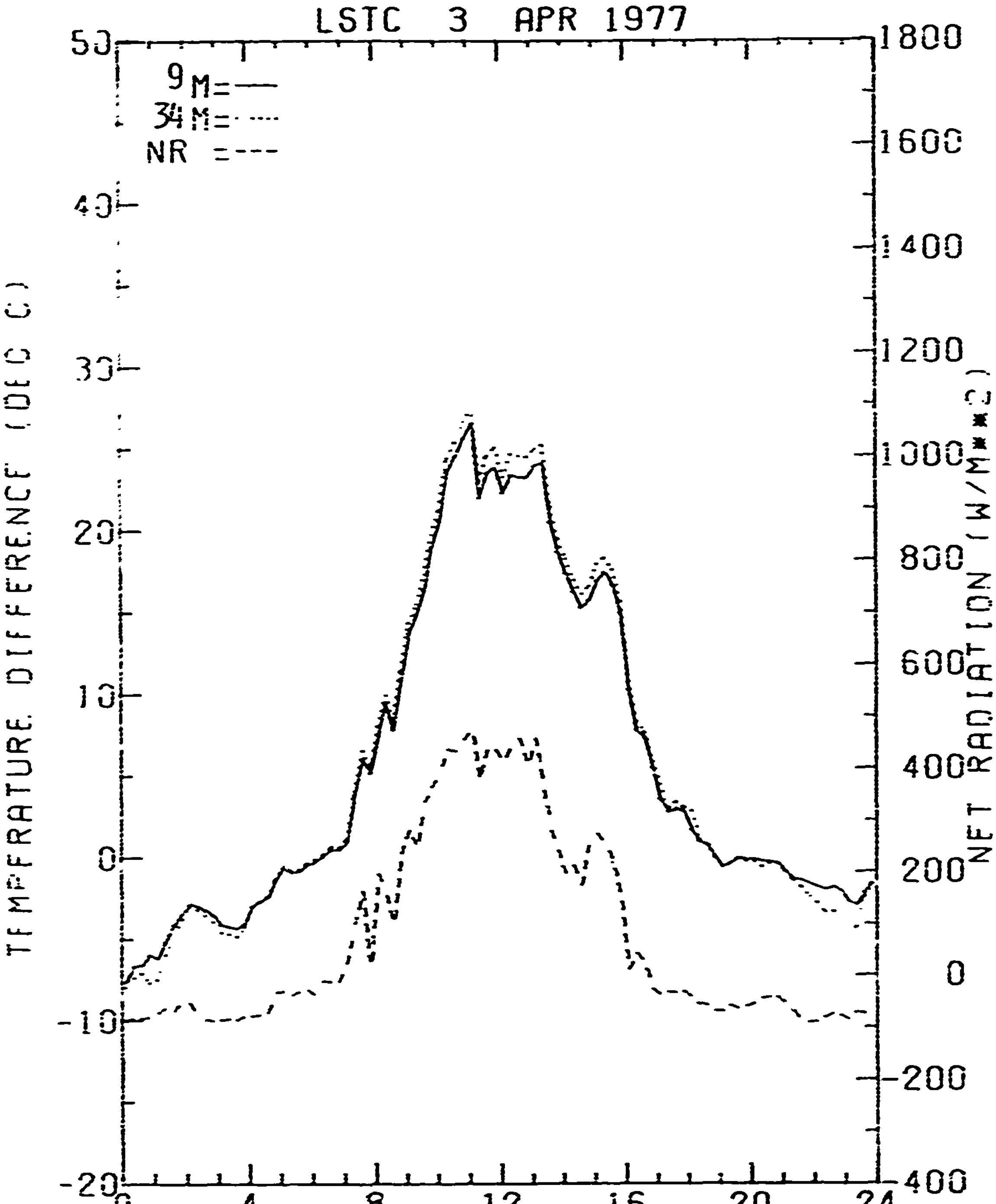


Figure 105. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 3 April 1977.

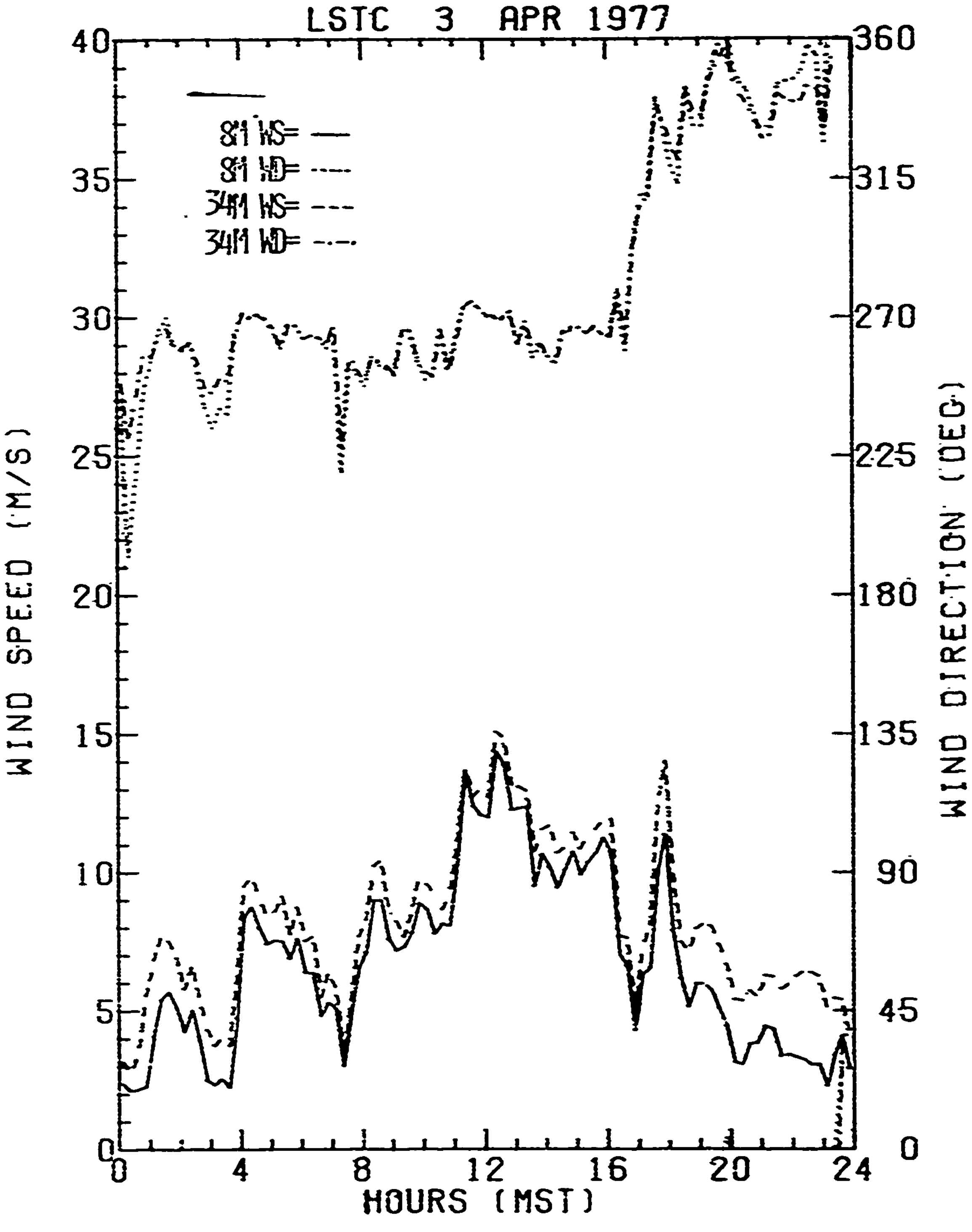


Figure 106. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 3 April 1977.

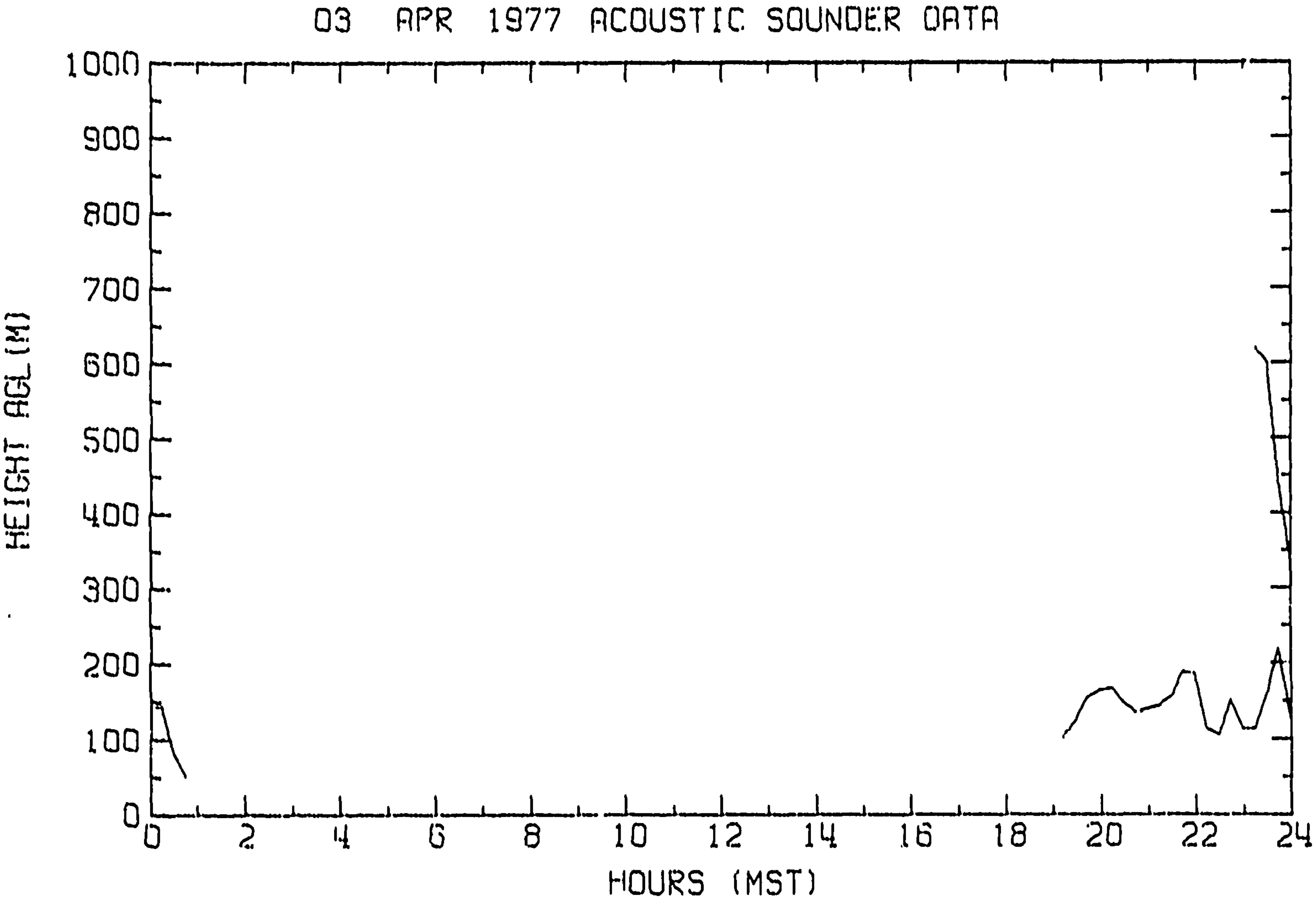


Figure 107. Inversion heights, LSTC, 3 April 1977.

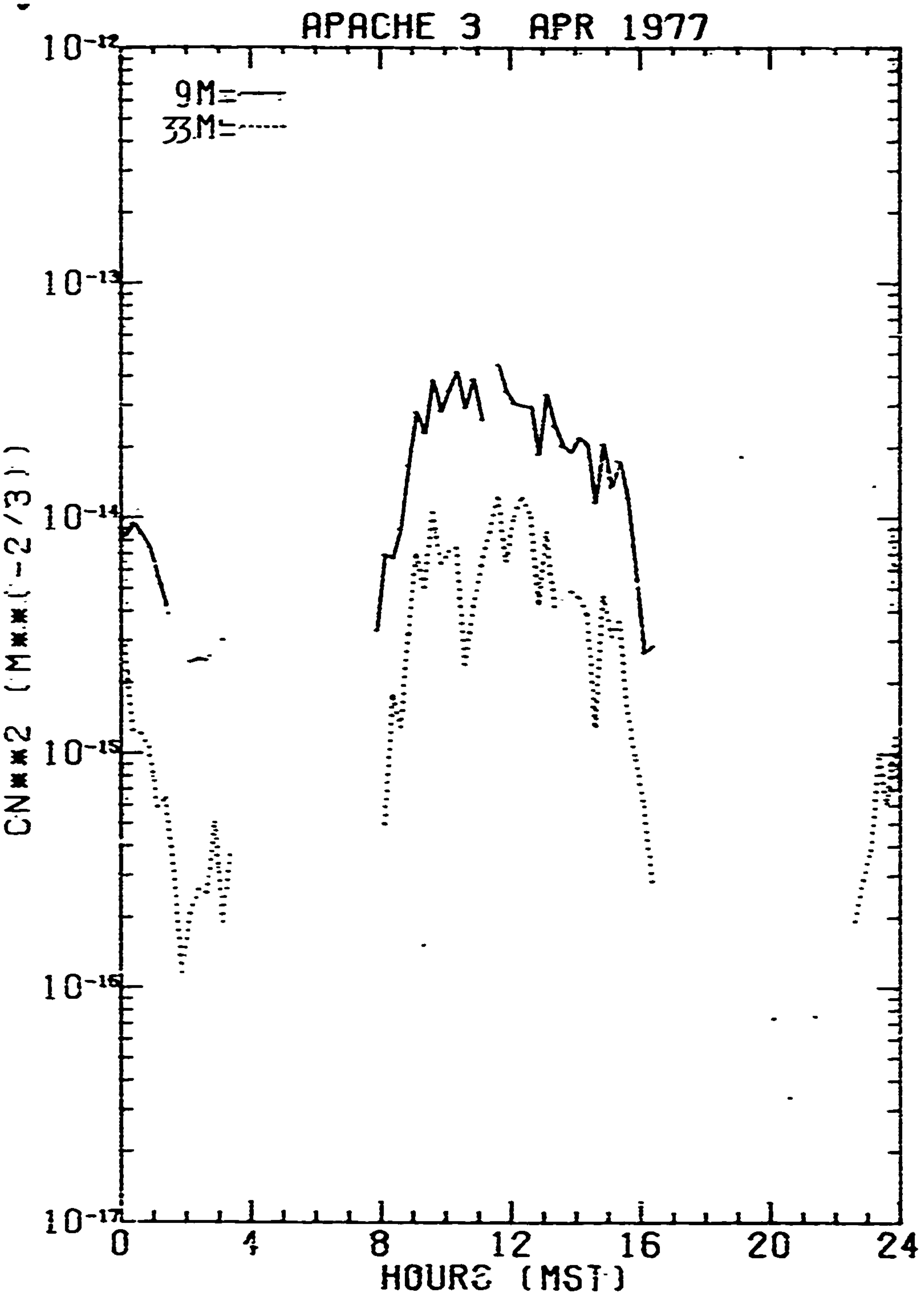


Figure 108. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 3 April 1977.

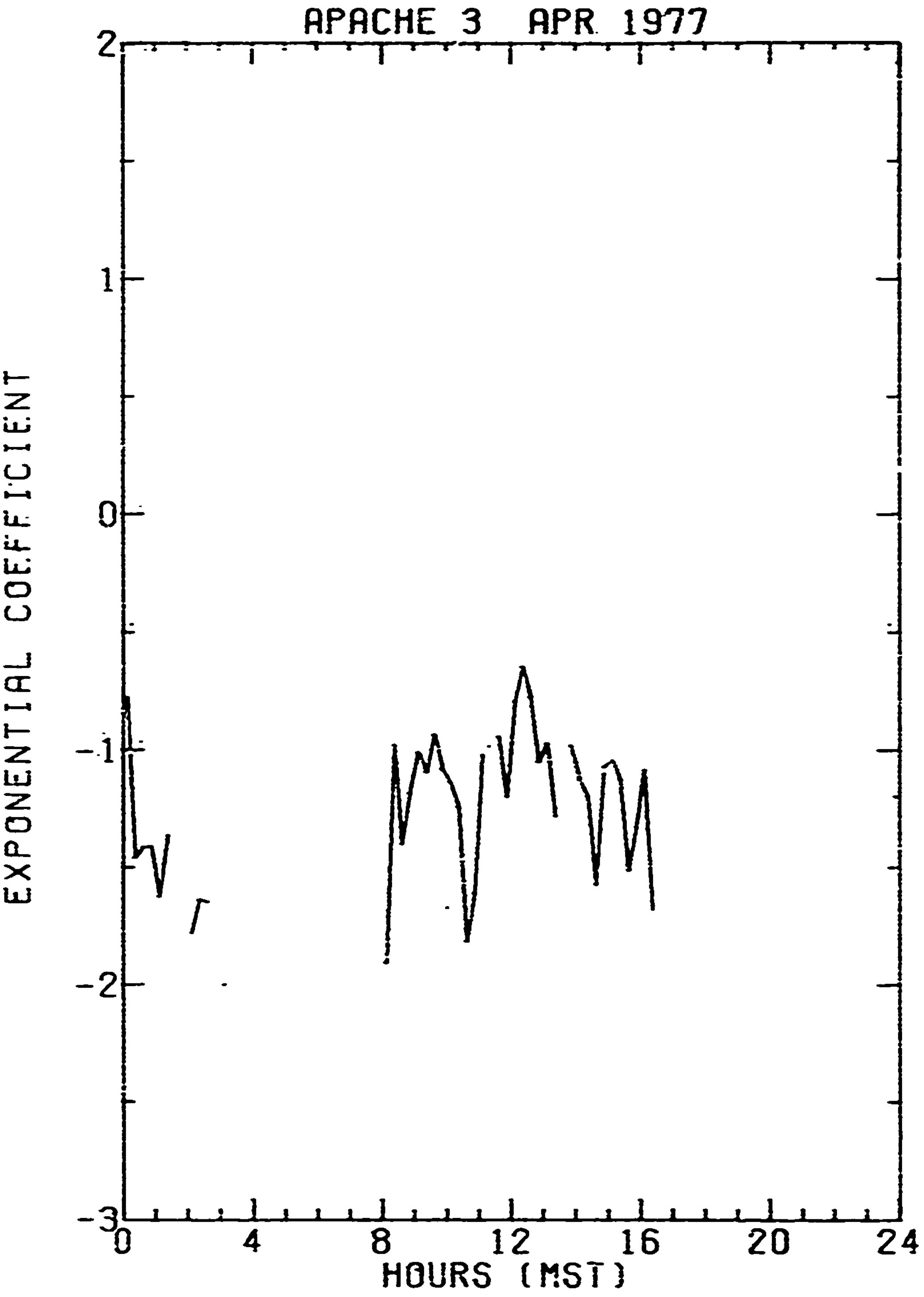


Figure 109. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 3 April 1977.

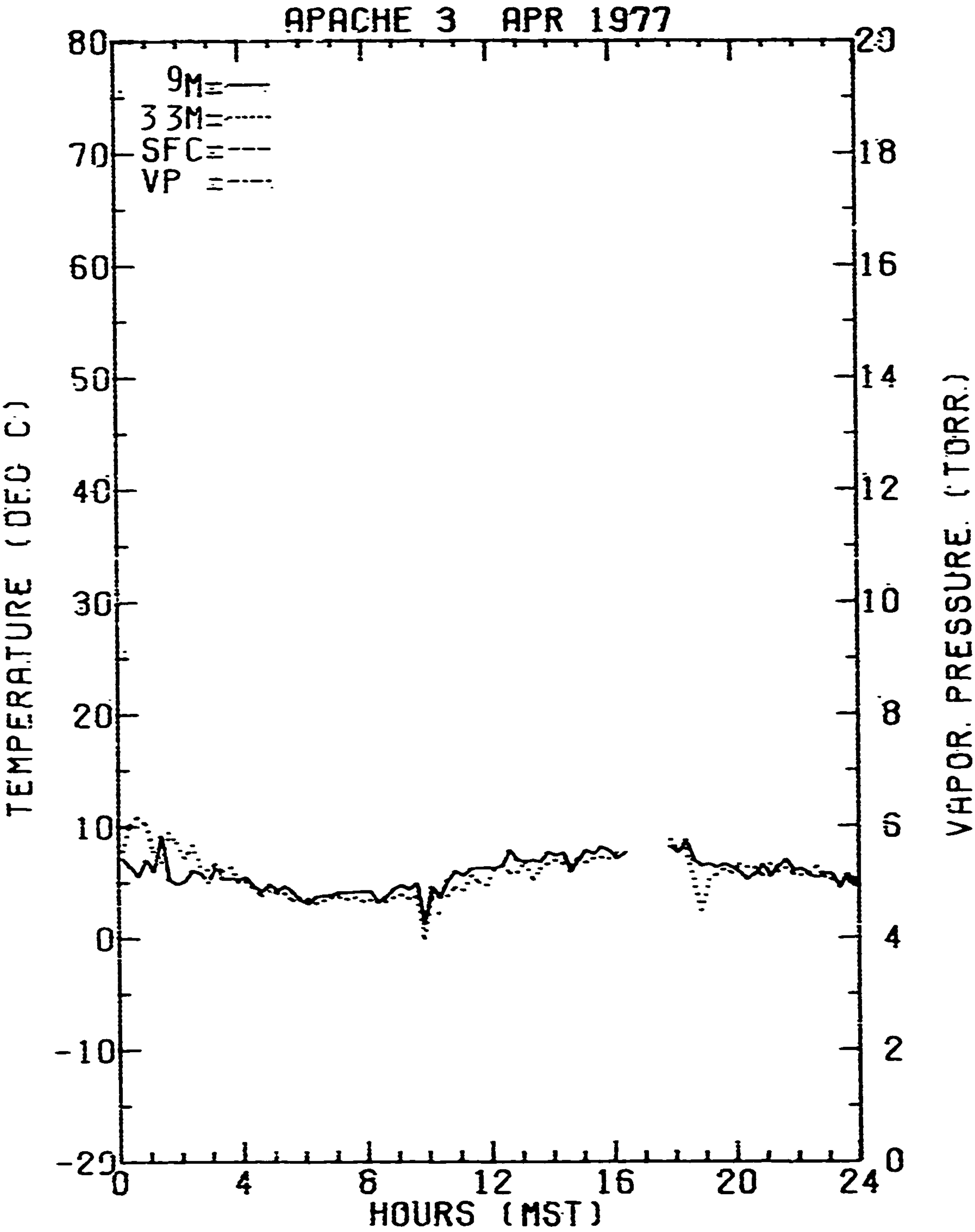


Figure 110. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 3 April 1977.

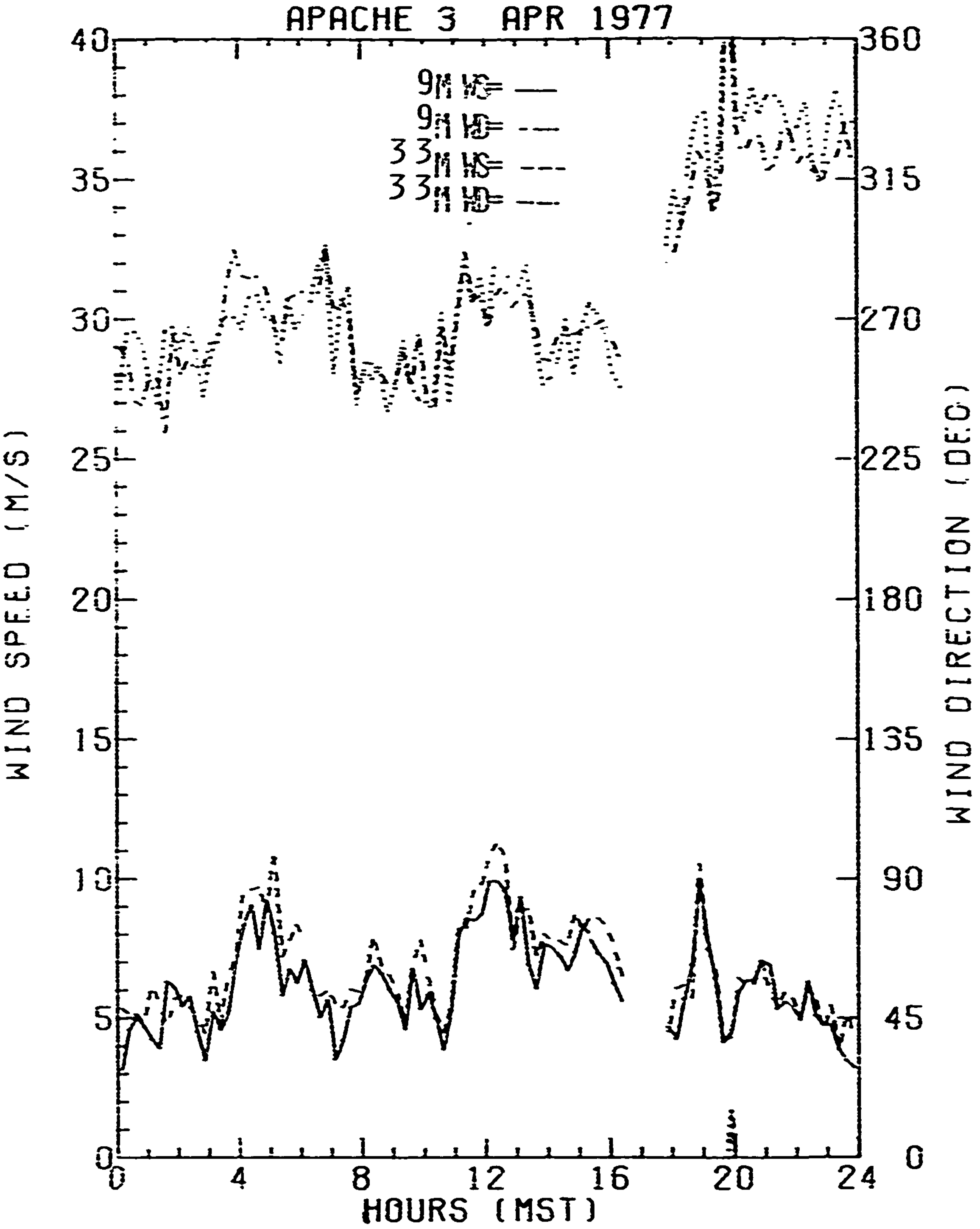


Figure 111. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 3 April 1977.

TABLE 63
APACHE SITE RAWINSONDE DATA

DATE: 03 APR 77 RELEASE NO.: 34 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	653.8	6.9	4.0	270.0	9.3
207.3	637.5	3.9	3.3	268.3	11.4
383.1	623.8	2.9	3.4	267.3	13.4
902.8	584.8	-1.3	3.7	246.2	11.9
1104.5	570.2	-3.3	3.5	239.3	14.2
1401.6	549.2	-4.1	3.1	236.0	18.7
1756.2	52[illegible]0	-7.4	2.4	233.6	20.8
1933.1	513.2	-7.9	2.3	234.1	21.1
2234.1	493.7	-9.4	1.5	233.3	21.2
2569.5	472.7	-11.5	1.2	233.6	22.1
2779.3	460.0	-12.2	0.8	234.8	26.8
2981.5	448.0	-13.0	0.5	233.7	30.2
3301.1	429.6	-13.4	0.4	232.9	25.4

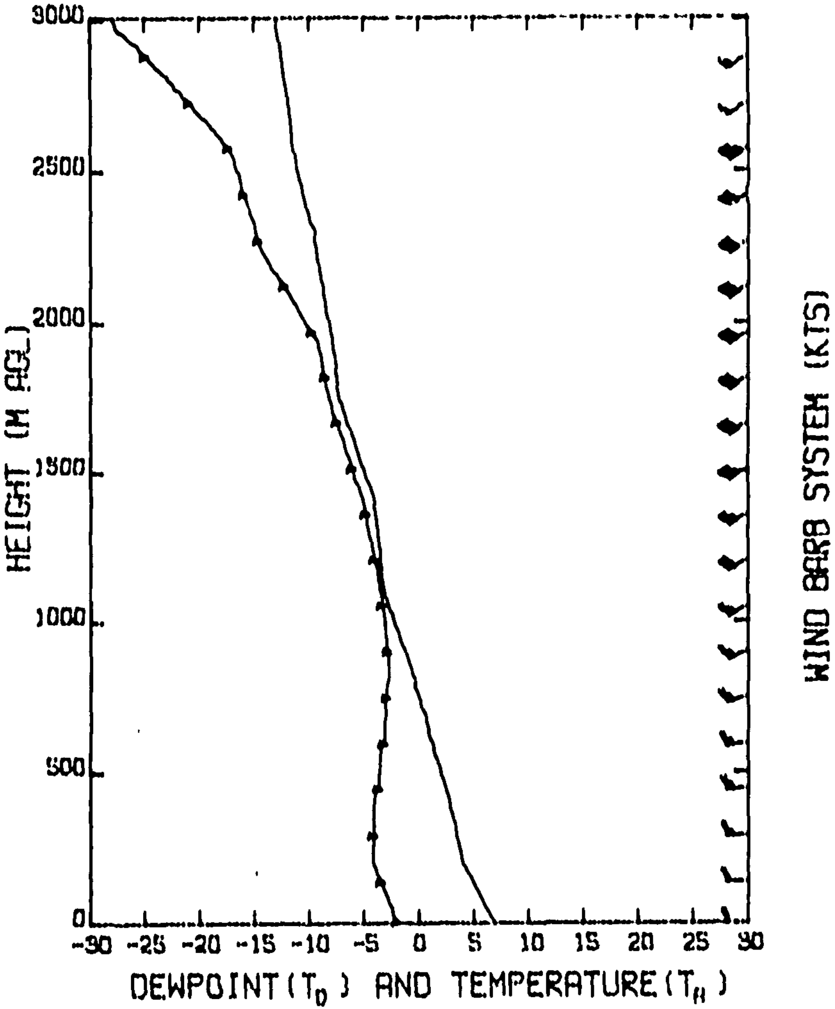


TABLE 64
APACHE SITE RAWINSONDE DATA

DATE: 03 APR 77 RELEASE NO.: 35 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	655.0	12.0	3.6	270.0	12.9
163.3	642.2	7.4	2.0	0.0	0.0
224.1	637.5	7.4	2.0	0.0	0.0
1288.8	558.6	-4.6	1.5	270.1	12.6
1583.9	538.0	-7.4	1.5	269.2	13.2
1773.7	525.0	-9.5	1.6	265.7	14.5
2211.0	496.0	-13.1	1.4	261.4	13.9
2439.2	481.3	-13.9	0.5	271.0	14.5
3163.6	437.1	-20.5	0.3	260.9	17.9

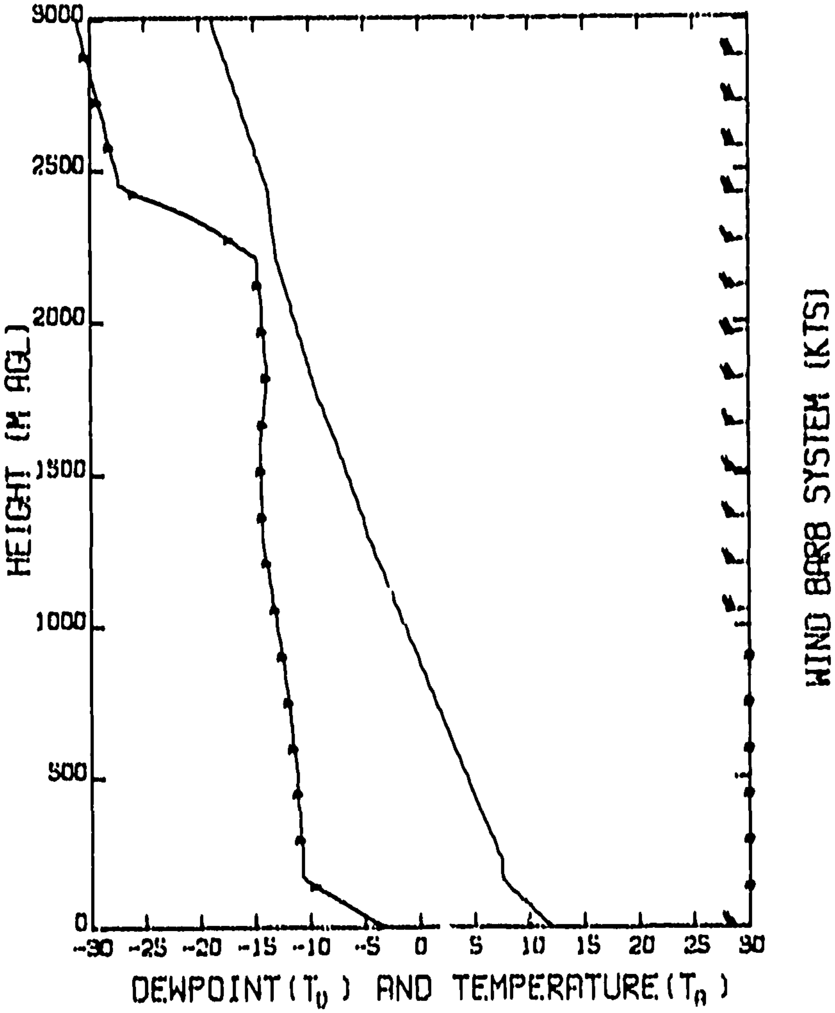


TABLE 65
APACHE SITE RAWINSONDE DATA

DATE: 03 APR 77 RELEASE NO.: 36 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	656.1	10.2	3.9	320.0	10.3
237.8	637.5	6.5	2.3	315.2	12.0
1221.0	564.6	-1.2	1.7	295.1	12.0
1795.2	525.0	-7.3	1.5	289.4	10.3
2555.5	475.7	-13.6	1.2	290.6	13.0
3687.6	409.0	-22.6	0.3	285.4	15.2

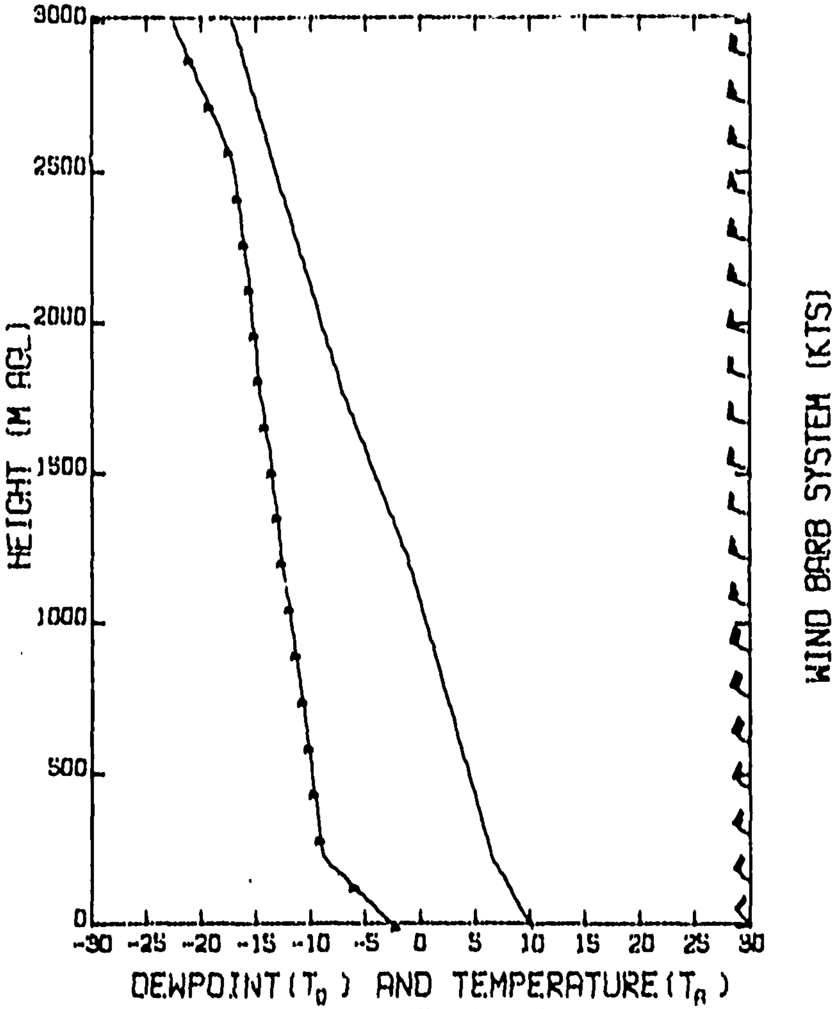
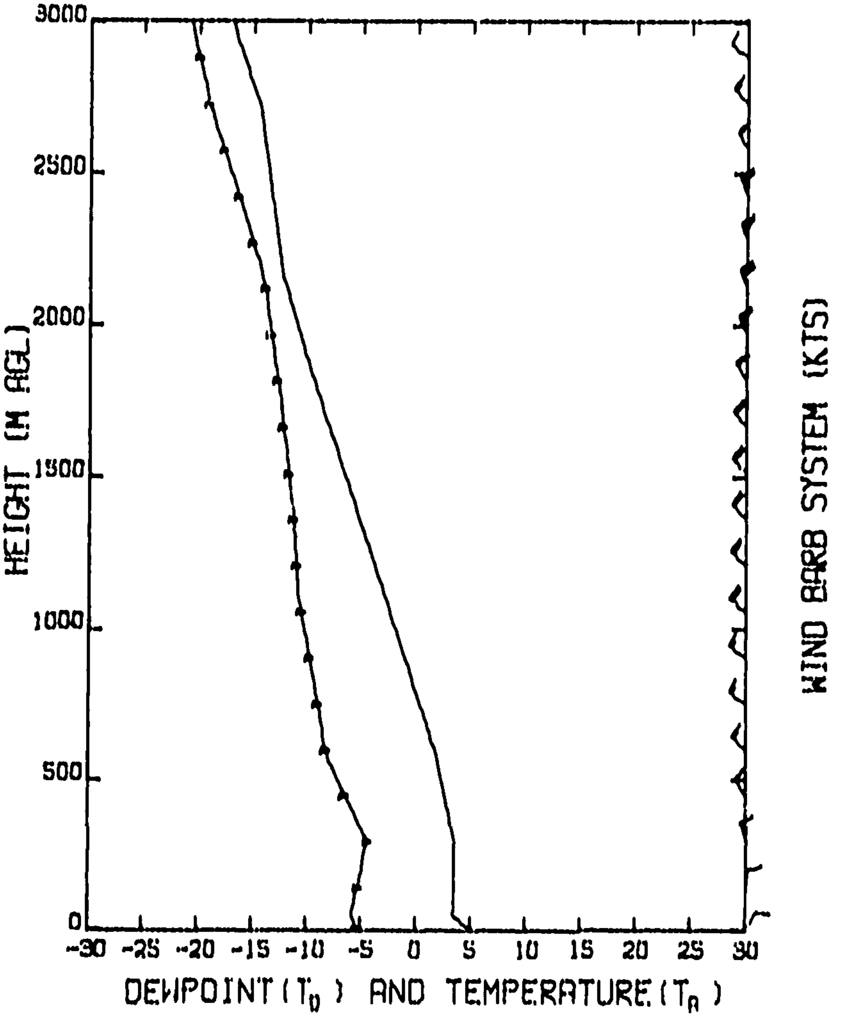


TABLE 66
APACHE SITE RAWINSONDE DATA

DATE: 03 APR 77 RELEASE NO.: 37 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	660.0	5.0	3.1	30.0	4.1
39.0	656.8	3.5	2.9	22.6	4.0
282.0	637.5	3.5	3.3	346.2	4.8
570.1	615.2	1.9	2.5	323.8	7.1
1099.7	575.8	-2.9	2.0	319.1	9.2
1824.3	525.0	-9.6	1.7	333.0	11.1
2163.8	502.3	-12.4	1.5	343.7	14.2
2712.6	467.5	-14.5	1.0	325.7	6.9
3034.4	448.0	-17.4	0.8	304.8	5.7



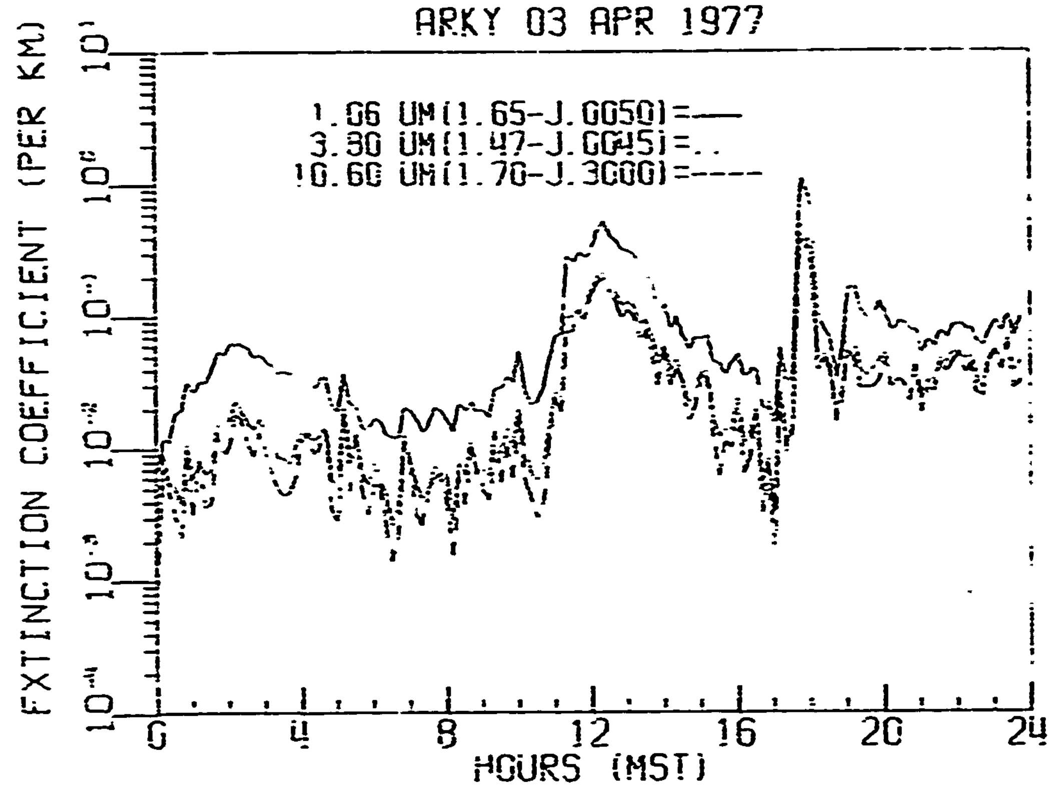


Figure 112. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 3 April 1977.

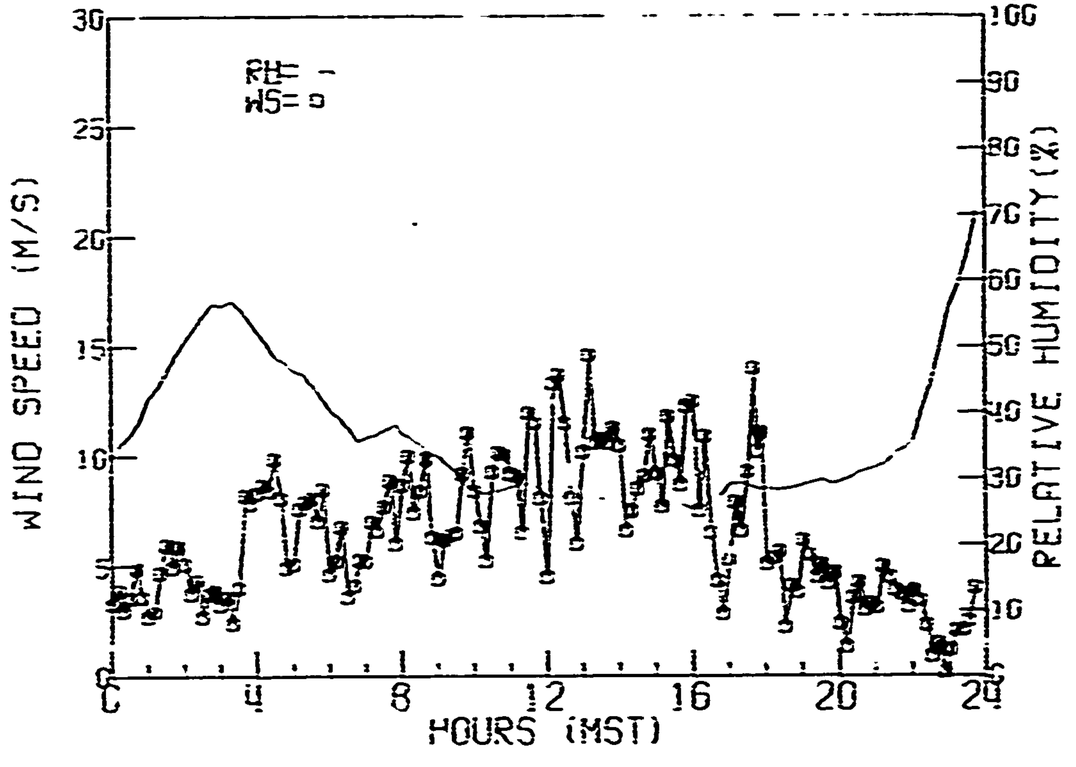


Figure 113. Diurnal variation of windspeed and relative himidity, Arky Site, 3 April 1977.

TABLE 67

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, [illegible]

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
		1	2	3	4	5	6	7	8	1.06	3.8	10.6	
03 APR 77													
0 : 0:00	600	.11+01	.26+00	.61-01	.00	.00	.00	.00	.00	.61-02	.20-02	.97-03	12.
0 :10:00	600	.92+00	.36+00	.15+00	.15-01	.00	.20-01	.00	.00	.12-01	.92-02	.78-02	103.
0 :20:00	600	.16+01	.24+00	.12+00	.15-01	.48-01	.00	.00	.00	.11-01	.56-02	.50-02	34.
0 :30:00	600	.39+01	.39+00	.71-01	.15-01	.00	.00	.00	.00	.19-01	.51-02	.32-02	41.
0 :40:00	600	.45+01	.41+00	.61-01	.00	.00	.00	.00	.00	.20-01	.39-02	.22-02	37.
0 :50:00	600	.61+01	.49+00	.91-01	.15-01	.00	.20-01	.00	.00	.32-01	.11-01	.72-02	139.
01:00:00	600	.63+01	.34+00	.18+00	.00	.00	.00	.00	.00	.28-01	.58-02	.32-02	90.
01:10:00	600	.69+01	.19+00	.30-01	.15-01	.95-01	.00	.00	.00	.32-01	.81-02	.55-02	75.
01:20:00	600	.73+01	.47+00	.18+00	.00	.00	.00	.00	.00	.32-01	.66-02	.37-02	59.
01:30:00	600	.90+01	.56+00	.12+00	.00	.00	.00	.00	.00	.39-01	.70-02	.40-02	70.
01:40:00	600	.11+02	.77+00	.21+00	.00	.48-01	.20-01	.00	.00	.55-01	.16-01	.13-01	177.
01:50:00	600	.11+02	.11+01	.15+00	.46-01	.00	.00	.00	.00	.53-01	.14-01	.57-02	117.
02:00:00	600	.12+02	.15+01	.43+00	.00	.48-01	.00	.00	.00	.61-01	.17-01	.10-01	120.
02:10:00	600	.12+02	.15+01	.30+00	.46-01	.49-01	.20-01	.00	.00	.65-01	.23-01	.15-01	219.
02:20:00	600	.12+02	.11+01	.21+00	.15-01	.96-02	.20-01	.00	.00	.61-01	.20-01	.17-01	203.
02:30:00	600	.12+02	.14+01	.24+00	.30-01	.49-01	.00	.00	.00	.59-01	.15-01	.11-01	127.
02:40:00	600	.10+02	.99+00	.27+00	.46-01	.00	.00	.00	.00	.50-01	.14-01	.89-02	113.
02:50:00	600	.94+01	.12+01	.24+00	.00	.49-01	.20-01	.00	.00	.52-01	.17-01	.13-01	174.
03:00:00	600	.91+01	.12+01	.15+00	.30-01	.48-01	.00	.00	.00	.47-01	.14-01	.98-02	106.
03:10:00	600	.89+01	.88+00	.19+00	.30-01	.00	.00	.00	.00	.43-01	.11-01	.68-02	92.
03:20:00	600	.78+01	.11+01	.91-01	.15-01	.00	.00	.00	.00	.38-01	.90-02	.53-02	76.
03:30:00	600	.82+01	.79+00	.21+00	.00	.00	.00	.00	.00	.38-01	.83-02	.46-02	69.
03:40:00	600	.81+01	.67+00	.91-01	.15-01	.00	.00	.00	.00	.37-01	.78-02	.48-02	73.
03:50:00	600	.80+01	.79+00	.30+00	.15-01	.00	.00	.00	.00	.39-01	.11-01	.50-02	79.
04:00:00	600	.57+01	.60+00	.15+00	.15-01	.48-01	.20-01	.00	.00	.33-01	.13-01	.12-01	147.
04:10:00	600	.42+01	.21+00	.12+00	.46-01	.49-01	.20-01	.00	.00	.27-01	.13-01	.13-01	149.
04:20:00	600	.49+01	.28+00	.27+00	.15-01	.00	.20-01	.00	.00	.28-01	.12-01	.94-02	131.
04:30:00	600	.61+01	.62+00	.91-01	.30-01	.00	.20-01	.00	.00	.34-01	.13-01	.10-01	149.
04:40:00	600	.59+01	.54+00	.21+00	.46-01	.48-01	.20-01	.00	.00	.36-01	.16-01	.14-01	166.
04:50:00	600	.47+01	.39+00	.12+00	.15-01	.00	.00	.00	.00	.22-01	.58-02	.36-02	47.
05:00:00	600	.40+01	.34+00	.24+00	.00	.00	.00	.00	.00	.19-01	.55-02	.28-02	36.
05:10:00	600	.53+01	.79+00	.47+00	.30-01	.95-01	.20-01	.00	.00	.38-01	.20-01	.17-01	172.
05:20:00	600	.40+01	.73+00	.12+00	.30-01	.00	.00	.00	.00	.23-01	.79-02	.49-02	56.
05:30:00	600	.25+01	.19+00	.91-01	.15-01	.00	.37-01	.00	.00	.21-01	.13-01	.13-01	191.
05:40:00	600	.25+01	.28+00	.91-01	.46-01	.00	.00	.00	.00	.14-01	.65-02	.47-02	49.
05:50:00	600	.25+01	.43+00	.15+00	.15-01	.00	.00	.00	.00	.15-01	.54-02	.32-02	35.
06:00:00	600	.29+01	.26+00	.21+00	.46-01	.00	.00	.00	.00	.17-01	.60-02	.54-02	53.
06:10:00	600	.29+01	.36+00	.61-01	.15-01	.49-01	.00	.00	.00	.16-01	.57-02	.52-02	43.
06:20:00	600	.25+01	.28+00	.12+00	.15-01	.00	.00	.00	.00	.13-01	.45-02	.27-02	31.
06:30:00	600	.25+01	.36+00	.30-01	.00	.00	.00	.00	.00	.12-01	.25-02	.14-02	22.
06:40:00	600	.25+01	.28+00	.61-01	.15-01	.00	.00	.00	.00	.12-01	.38-02	.25-02	10.

TABLE 67 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
03 APR 77														
	06:50:00	600	.26+01	.36+00	.12+00	.61-01	.00	.20-01	.00	.00	.21-01	.13-01	.11-01	139.
	07:00:00	600	.35+01	.30+00	.61-01	.46-01	.49-01	.00	.00	.00	.19-01	.82-02	.73-02	62.
	07:10:00	600	.33+01	.34+00	.15+00	.15-01	.00	.00	.00	.00	.17-01	.54-02	.32-02	38.
	07:20:00	600	.29+01	.24+00	.91-01	.14-01	.00	.00	.00	.00	.14-01	.42-02	.26-02	32.
	07:30:00	600	.30+01	.21+00	.30-01	.15-01	.48-01	.00	.00	.00	.16-01	.51-02	.49-02	41.
	07:40:00	600	.35+01	.54+00	.12+00	.15-01	.49-01	.00	.00	.00	.21-01	.73-02	.50-02	51.
	07:50:00	600	.36+01	.21+00	.00	.00	.00	.20-01	.00	.00	.19-01	.68-02	.66-02	107.
	08:00:00	600	.31+01	.30+00	.15+00	.30-01	.00	.00	.00	.00	.17-01	.53-02	.41-02	45.
	08:10:00	600	.32+01	.17+00	.91-01	.00	.00	.00	.00	.00	.14-01	.29-02	.16-02	25.
	08:20:00	600	.40+01	.28+00	.12+00	.30-01	.49-01	.00	.00	.00	.22-01	.79-02	.59-02	59.
	08:30:00	600	.39+01	.41+00	.21+00	.15-01	.00	.00	.00	.00	.20-01	.66-02	.38-02	45.
	08:40:00	600	.35+01	.26+00	.91-01	.46-01	.00	.20-01	.00	.00	.22-01	.11-01	.10-01	134.
	08:50:00	600	.33+01	.47+00	.61-01	.00	.96-01	.00	.00	.00	.20-01	.68-02	.70-02	48.
	09:00:00	600	.37+01	.28+00	.91-01	.46-01	.00	.00	.00	.00	.19-01	.73-02	.50-02	56.
	09:10:00	600	.33+01	.43+00	.91-01	.30-01	.00	.00	.00	.00	.18-01	.62-02	.41-02	46.
	09:20:00	600	.42+01	.36+00	.15+00	.00	.00	.39-01	.00	.00	.28-01	.14-01	.13-01	197.
	09:30:00	600	.58+01	.60+00	.21+00	.30-01	.00	.00	.00	.00	.29-01	.92-02	.57-02	68.
	09:40:00	600	.63+01	.67+00	.43+00	.46-01	.49-01	.00	.00	.00	.35-01	.15-01	.10-01	93.
	09:50:00	600	.63+01	.67+00	.24+00	.30-01	.00	.00	.00	.00	.32-01	.10-01	.61-02	73.
	10:00:00	600	.97+01	.12+01	.37+00	.46-01	.11+00	.00	.00	.00	.55-01	.23-01	.17-01	141.
	10:10:00	600	.51+01	.64+00	.24+00	.30-01	.00	.00	.00	.00	.27-01	.94-02	.57-02	65.
	10:20:00	600	.45+01	.41+00	.91-01	.30-01	.00	.00	.00	.00	.22-01	.63-02	.44-02	53.
	10:30:00	600	.47+01	.73+00	.12+00	.00	.00	.00	.00	.00	.23-01	.58-02	.30-02	43.
	10:40:00	600	.63+01	.58+00	.27+00	.00	.00	.00	.00	.00	.30-01	.75-02	.40-02	56.
	10:50:00	600	.93+01	.79+00	.18+00	.15-01	.00	.20-01	.00	.00	.47-01	.14-01	.11-01	165.
	11:00:00	600	.12+02	.12+01	.24+00	.76-01	.11+00	.20-01	.00	.00	.71-01	.27-01	.25-01	254.
	11:10:00	600	.15+02	.13+01	.46+00	.46-01	.14+00	.00	.00	.00	.76-01	.24-01	.19-01	177.
	11:20:00	600	.55+02	.58+01	.14+01	.21+00	.24+00	.59-01	.00	.00	.29+00	.13+00	.76-01	877.
	11:30:00	600	.46+02	.48+01	.14+01	.17+00	.19+00	.12+00	.00	.00	.26+00	.98-01	.80-01	1014.
	11:40:00	600	.52+02	.53+01	.11+01	.26+00	.35+00	.11+00	.00	.00	.31+00	.13+00	.11+00	1379.
	11:50:00	600	.51+02	.43+01	.12+01	.24+00	.29+00	.12+00	.00	.00	.28+00	.11+00	.93-01	1120.
	12:00:00	600	.51+02	.50+01	.17+01	.32+00	.43+00	.25+00	.00	.00	.33+00	.15+00	.14+00	1749.
	12:10:00	600	.75+02	.70+01	.28+01	.38+00	.53+00	.30+00	.00	.00	.46+00	.20+00	.18+00	2172.
	12:20:00	600	.90+02	.88+01	.25+01	.36+00	.87+00	.21+00	.00	.00	.53+00	.22+00	.19+00	2259.
	12:30:00	600	.70+02	.79+01	.18+01	.43+00	.58+00	.18+00	.00	.00	.41+00	.17+00	.15+00	1678.
	12:40:00	600	.64+02	.57+01	.17+01	.32+00	.55+00	.15+00	.00	.00	.37+00	.15+00	.13+00	1472.
	12:50:00	600	.57+02	.59+01	.18+01	.24+00	.34+00	.12+00	.00	.00	.32+00	.12+00	.10+00	1170.
	13:00:00	600	.51+02	.58+01	.14+01	.33+00	.35+00	.11+00	.00	.00	.31+00	.13+00	.11+00	1272.
	13:10:00	600	.50+02	.54+01	.19+01	.32+00	.48+00	.79-01	.00	.00	.27+00	.12+00	.10+00	1035.
	13:20:00	600	.43+02	.46+01	.16+01	.23+00	.11+00	.77-01	.00	.00	.24+00	.93-01	.69-01	843.
	13:30:00	600	.33+02	.41+01	.14+01	.21+00	.19+00	.12+00	.00	.00	.21+00	.94-01	.79-01	945.

TABLE 67 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
03 APR 77														
	13:40:00	600	.30+02	.38+01	.12+01	.14+00	.14+00	.59-01	.00	.00	.17+00	.68-01	.53-01	618.
	13:50:00	600	.19+02	.26+01	.89+00	.17+00	.00	.23-01	.00	.00	.11+00	.44-01	.30-01	355.
	14:00:00	600	.17+02	.28+01	.67+00	.18+00	.14+00	.98-01	.00	.00	.12+00	.66-01	.58-01	693.
	14:10:00	600	.13+02	.23+01	.67+00	.76-01	.00	.57-01	.00	.00	.82-01	.59-01	.31-01	409.
	14:20:00	600	.15+02	.23+01	.40+00	.14+00	.00	.79-01	.00	.00	.98-01	.47-01	.40-01	574.
	14:30:00	600	.11+02	.11+01	.30+00	.13-01	.27+00	.37-01	.00	.00	.73-01	.31-01	.33-01	315.
	14:40:00	600	.10+02	.11+01	.40+00	.11+00	.48-01	.00	.00	.00	.57-01	.22-01	.16-01	161.
	14:50:00	600	.12+02	.17+01	.51+00	.12+00	.49-01	.00	.00	.00	.69-01	.29-01	.20-01	192.
	15:00:00	600	.97+01	.12+01	.46+00	.30-01	.96-01	.74-01	.00	.00	.70-01	.37-01	.35-01	447.
	15:10:00	600	.13+02	.13+01	.45+00	.11+00	.95-01	.57-01	.00	.00	.72-01	.39-01	.35-01	412.
	15:20:00	600	.78+01	.12+01	.30+00	.00	.48-01	.20-01	.00	.00	.46-01	.17-01	.13-01	165.
	15:30:00	600	.85+01	.12+01	.43+00	.00	.00	.00	.00	.00	.43-01	.12-01	.63-02	92.
	15:40:00	600	.65+01	.64+00	.21+00	.30-01	.00	.20-01	.00	.00	.36-01	.14-01	.11-01	154.
	15:50:00	600	.93+01	.56+00	.33+00	.00	.00	.23-01	.00	.00	.45-01	.14-01	.10-01	155.
	16:00:00	600	.82+01	.75+00	.33+00	.46-01	.48-01	.39-01	.00	.00	.51-01	.24-01	.21-01	267.
	16:10:00	600	.73+01	.73+00	.33+00	.33-01	.00	.00	.00	.00	.36-01	.11-01	.57-02	93.
	16:20:00	600	.75+01	.86+00	.36+00	.35-01	.48-01	.00	.00	.00	.39-01	.12-01	.85-02	85.
	16:30:00	600	.57+01	.59+00	.27+00	.00	.95-01	.37-01	.00	.00	.39-01	.19-01	.19-01	229.
	16:40:00	600	.43+01	.34+00	.51-01	.15-01	.00	.00	.00	.00	.20-01	.51-02	.32-02	43.
	16:50:00	600	.39+01	.39+00	.91-01	.00	.00	.23-01	.00	.00	.22-01	.85-02	.74-02	113.
	17:00:00	600	.34+01	.36+00	.61-01	.00	.00	.00	.00	.00	.16-01	.33-02	.18-02	29.
	17:10:00	600	.91+01	.79+00	.27+00	.46-01	.11+00	.37-01	.00	.00	.58-01	.27-01	.26-01	291.
	17:20:00	600	.57+01	.62+00	.12+00	.15-01	.96-01	.00	.00	.00	.31-01	.10-01	.93-02	76.
	17:30:00	600	.59+01	.80+00	.15+00	.61-01	.95-01	.00	.00	.00	.35-01	.13-01	.13-01	105.
	17:40:00	600	.91+02	.12+02	.41+01	.55+00	.72+00	.20+00	.00	.00	.55+00	.24+00	.19+00	2097.
	17:45:12	342	.18+03	.25+02	.95+01	.14+01	.67+00	.45+00	.00	.00	.11+01	.49+00	.38+00	4471.
	17:52:59	437	.14+03	.18+02	.73+01	.11+01	.17+01	.35+00	.00	.00	.90+00	.42+00	.36+00	3694.
	18:02:00	541	.11+03	.16+02	.47+01	.94+00	.91+00	.27+00	.00	.00	.67+00	.33+00	.24+00	2557.
	18:12:00	600	.15+02	.23+01	.82+00	.18+00	.19+00	.20-01	.00	.00	.98-01	.48-01	.39-01	365.
	18:22:00	600	.84+01	.13+01	.59+00	.14+00	.96-01	.93-01	.00	.00	.79-01	.51-01	.45-01	585.
	18:32:00	600	.79+01	.12+01	.46+00	.15+00	.24+00	.39-01	.00	.00	.67-01	.41-01	.40-01	370.
	18:42:00	600	.45+01	.64+00	.43+00	.51-01	.45-01	.23-01	.00	.00	.34-01	.19-01	.16-01	172.
	18:52:00	600	.89+01	.13+01	.33+00	.76-01	.48-01	.39-01	.00	.00	.59-01	.29-01	.24-01	296.
	19:02:00	600	.27+02	.34+01	.13+01	.23+00	.95-01	.57-01	.00	.00	.16+00	.73-01	.54-01	627.
	19:12:00	600	.29+02	.42+01	.13+01	.17+00	.96-01	.39-01	.00	.00	.77+00	.67-01	.48-01	550.
	19:22:00	600	.19+02	.31+01	.73+00	.76-01	.17+00	.00	.00	.00	.11+00	.39-01	.29-01	263.
	19:32:00	600	.17+02	.24+01	.61+00	.30-01	.19+00	.20-01	.00	.00	.97-01	.35-01	.29-01	291.
	19:42:00	600	.15+02	.24+01	.91+00	.12+00	.45-01	.23-01	.00	.00	.94-01	.43-01	.28-01	312.
	19:52:00	600	.23+02	.34+01	.10+01	.12+00	.14+00	.00	.00	.00	.13+00	.47-01	.32-01	317.
	20:02:00	600	.15+02	.24+01	.61+00	.12+00	.21+00	.57-01	.00	.00	.13+00	.52-01	.47-01	495.
	20:12:00	600	.13+02	.17+01	.76+00	.11+00	.14+00	.20-01	.00	.00	.80-01	.37-01	.30-01	289.

TABLE 67 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
			1	2	3	4	5	6	7	8	1.06	3.8	10.6	
03 APR 77														
	20:22:00	600	.14+02	.21+01	.63+00	.31+00	.96-01	.39-01	.00	.00	.89-01	.40-01	.33-01	373.
	20:32:00	600	.14+02	.20+01	.77+00	.76-01	.95-01	.37-01	.00	.00	.89-01	.43-01	.32-01	359.
	20:42:00	600	.14+02	.21+01	.64+00	.14+00	.48-01	.00	.00	.00	.80-01	.32-01	.22-01	219.
	20:52:00	600	.95+01	.12+01	.54+00	.61-01	.95-01	.93-01	.00	.00	.77-01	.45-01	.43-01	547.
	21:02:00	600	.84+01	.12+01	.37+00	.76-01	.48-01	.20-01	.00	.00	.52-01	.24-01	.19-01	211.
	21:12:00	600	.91+01	.18+01	.43+00	.76-01	.95-01	.37-01	.00	.00	.65-01	.33-01	.28-01	314.
	21:22:00	600	.82+01	.15+01	.55+00	.14+00	.96-01	.20-01	.00	.00	.60-01	.33-01	.27-01	261.
	21:32:00	600	.85+01	.17+01	.82+00	.76-01	.27+00	.57-01	.00	.00	.76-01	.45-01	.45-01	434.
	21:42:00	600	.80+01	.15+01	.58+00	.15+00	.96-01	.59-01	.00	.00	.69-01	.44-01	.39-01	431.
	21:52:00	600	.97+01	.21+01	.75+00	.14+00	.00	.93-01	.00	.00	.85-01	.54-01	.45-01	585.
	22:02:00	600	.10+02	.19+01	.64+00	.12+00	.38+00	.59-01	.00	.00	.89-01	.54-01	.53-01	488.
	22:12:00	600	.13+02	.18+01	.94+00	.14+00	.45-01	.57-01	.00	.00	.81-01	.47-01	.39-01	441.
	22:22:00	600	.95+01	.16+01	.97+00	.15+00	.24+00	.39-01	.00	.00	.80-01	.49-01	.43-01	397.
	22:32:00	600	.86+01	.17+01	.92+00	.76-01	.14+00	.23-01	.00	.00	.64-01	.54-01	.27-01	297.
	22:42:00	600	.88+01	.14+01	.46+00	.30-01	.96-01	.39-01	.00	.00	.60-01	.28-01	.24-01	283.
	22:52:00	600	.85+01	.21+01	.64+00	.15+00	.17+00	.57-01	.00	.00	.83-01	.53-01	.45-01	463.
	23:02:00	600	.10+02	.19+01	.49+00	.91-01	.24+00	.98-01	.00	.00	.92-01	.56-01	.56-01	612.
	23:12:00	600	.95+01	.19+01	.73+00	.11+00	.24+00	.37-01	.00	.00	.78-01	.44-01	.39-01	371.
	23:22:00	600	.12+02	.20+01	.10+01	.14+00	.96-01	.14+00	.00	.00	.10+00	.69-01	.62-01	782.
	23:32:00	600	.95+01	.21+01	.94+00	.12+00	.95-01	.23-01	.00	.00	.71-01	.37-01	.29-01	278.
	23:42:00	600	.15+02	.25+01	.10+01	.17+00	.48-01	.20-01	.00	.00	.96-01	.45-01	.32-01	339.

Weather Summary

Date: 4 April 1977

Synoptic

Surface: Weak surface pressure gradient over the southwestern United States.

500 Millibar: Northeast-southwest oriented trough over WSMR with strong southwesterly flow in advance of the trough and strong northerly flow behind the trough over New Mexico.

Holloman AFB

Clouds: Clear to few high clouds (cirrus).

Wind: Light and variable except northwesterly 5 m sec^{-1} during late morning and afternoon. Peak gust of 8 m sec^{-1} out of the northwest observed shortly after 1100 MST.

Visibility: Greater than 60 km.

Maximum temperature:	18.9°C	Corresponding vapor pressure:	2.1 Torr
Minimum temperature:	-0.6°C	Corresponding vapor pressure:	2.9 Torr

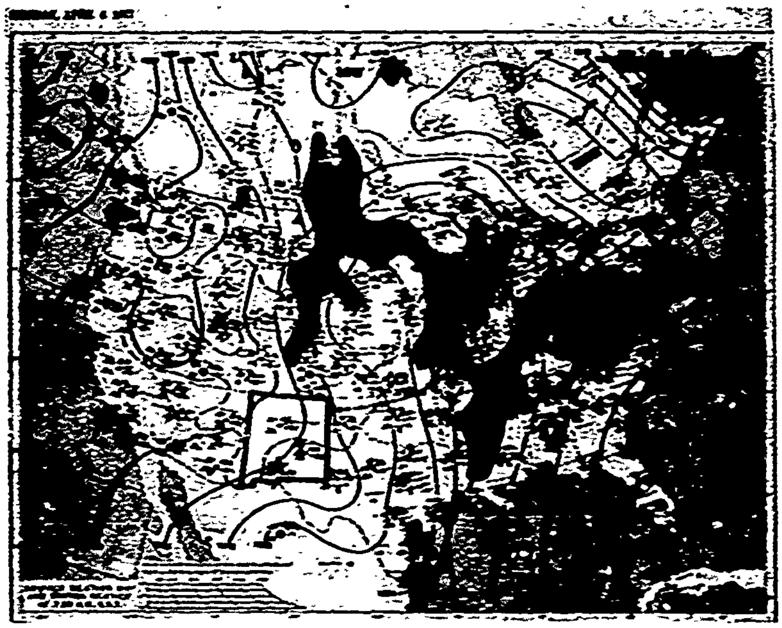


Figure 114a. Surface weather map for 4 April 1977.

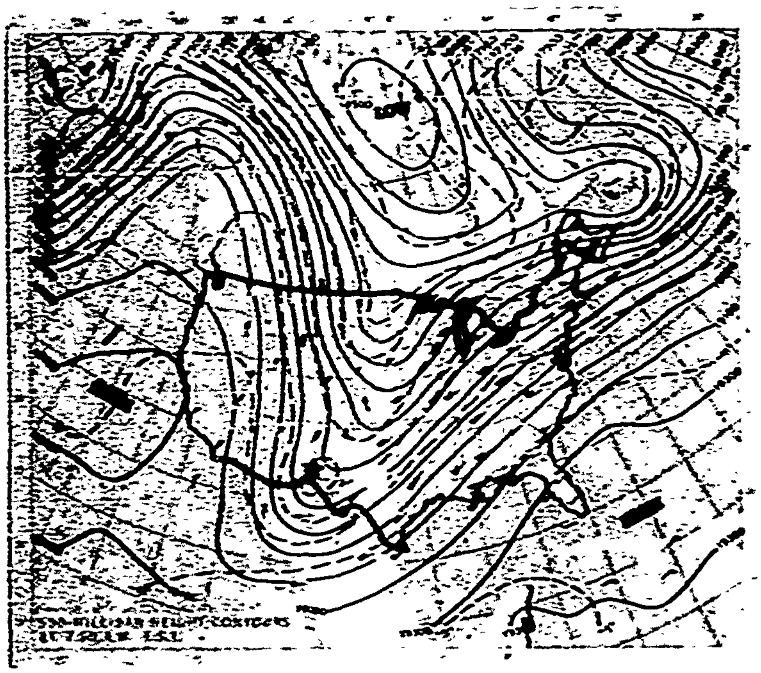


Figure 114b. 500-millibar height contours for 4 April 1977.

TABLE 68. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 4 April 1977 Remarks
0100	1.9	3.5	-3.6	0	0	0	
0200	0.7	3.5	-3.8	0	0	0	
0300	-1.6	2.9	-6.2	0	0	0	
0400	-2.5	2.6	-7.8	0	0	0	Plane observed
0500	-2.6	2.7	-6.9	0	0	0	
0600	-1.9	2.7	-7.0	0	0	0	
0700	-0.1	2.8	-6.5	0	0	0	
0800	4.0	2.7	-6.9	0	0	0	
0900	7.3	3.1	-5.2	0	0	0	
1000	10.0	2.8	-6.4	0	0	0	Apache tape changed 0945-1020 - recal 32 ΔT - unable to adjust either T/C to any constant readout - uvw's and 8 ΔT ok - time on datalogger 1 hour fast - reset time
1100	12.3	2.9	-6.3	0	0	0	
1200	13.2	3.1	-5.3	0	0	0	
1300	14.9	3.3	-4.6	0	0	0	Recal LSTC ΔT's - all else ok, plane observed 1220-1300
1400	16.5	2.6	-7.4	0	0	0	
1500	16.9	2.5	-8.3	0	0	0	1345-1445 - fixed grounding problem on Apache datalogger, all Apache data ok
1600	15.9	2.3	-8.8	0	0	0	
1700	16.5	1.5	-14.8	0	0	0	8 m u-v-w at Apache was 90° off corrected at 1700
1800	16.0	2.1	-10.1	0	0	0	
1900	10.5	2.0	-10.6	0	0	0	
2000	6.4	1.7	-13.0	0	0	0	
2100	8.5	2.8	-6.4	0	0	0	
2200	8.2	2.0	-10.9	0	0	0	
2300	2.8	1.7	-12.9	0	0	0	
2400	3.3	1.9	-11.2	0	0	0	

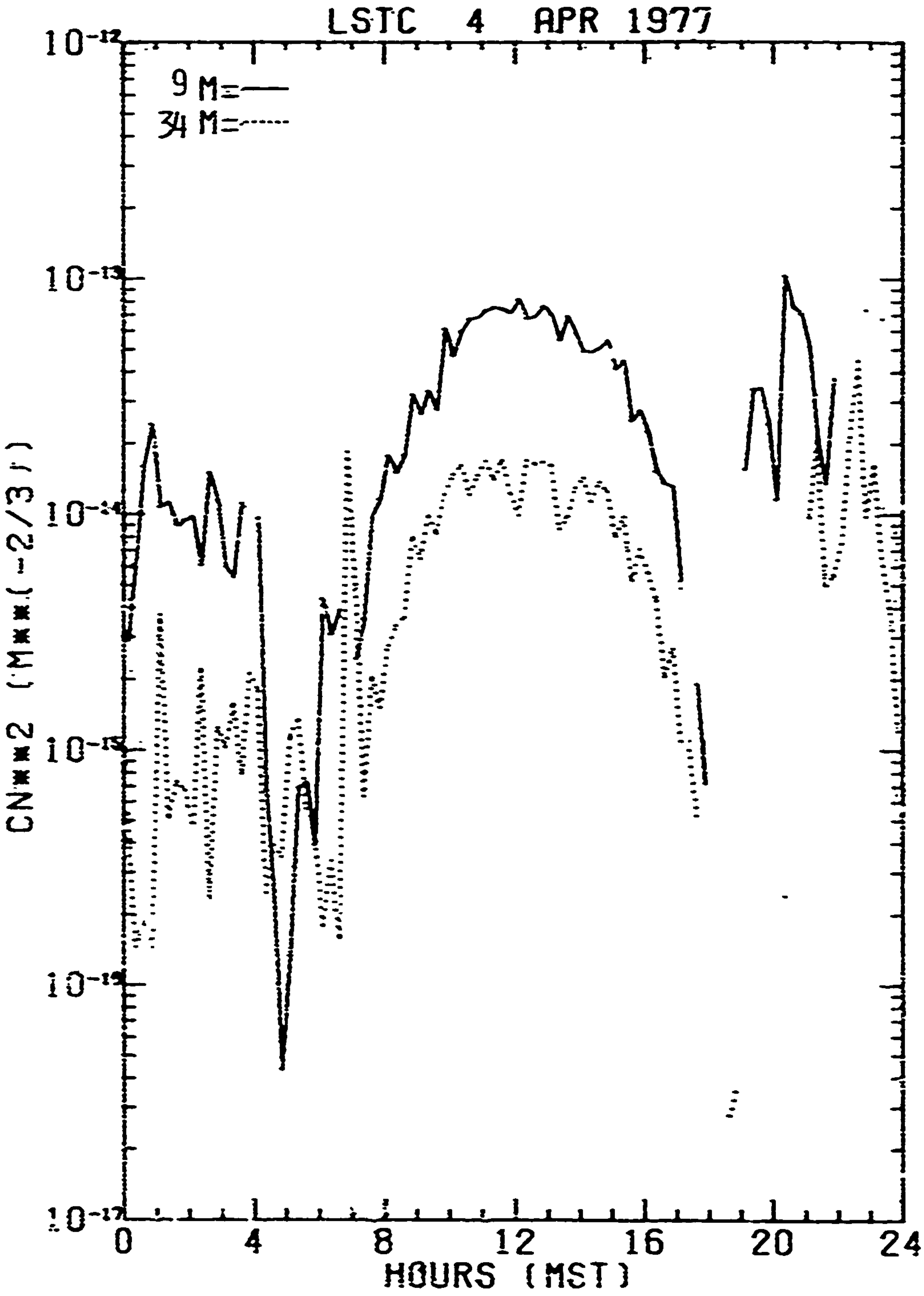


Figure 115. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 4 April 1977.

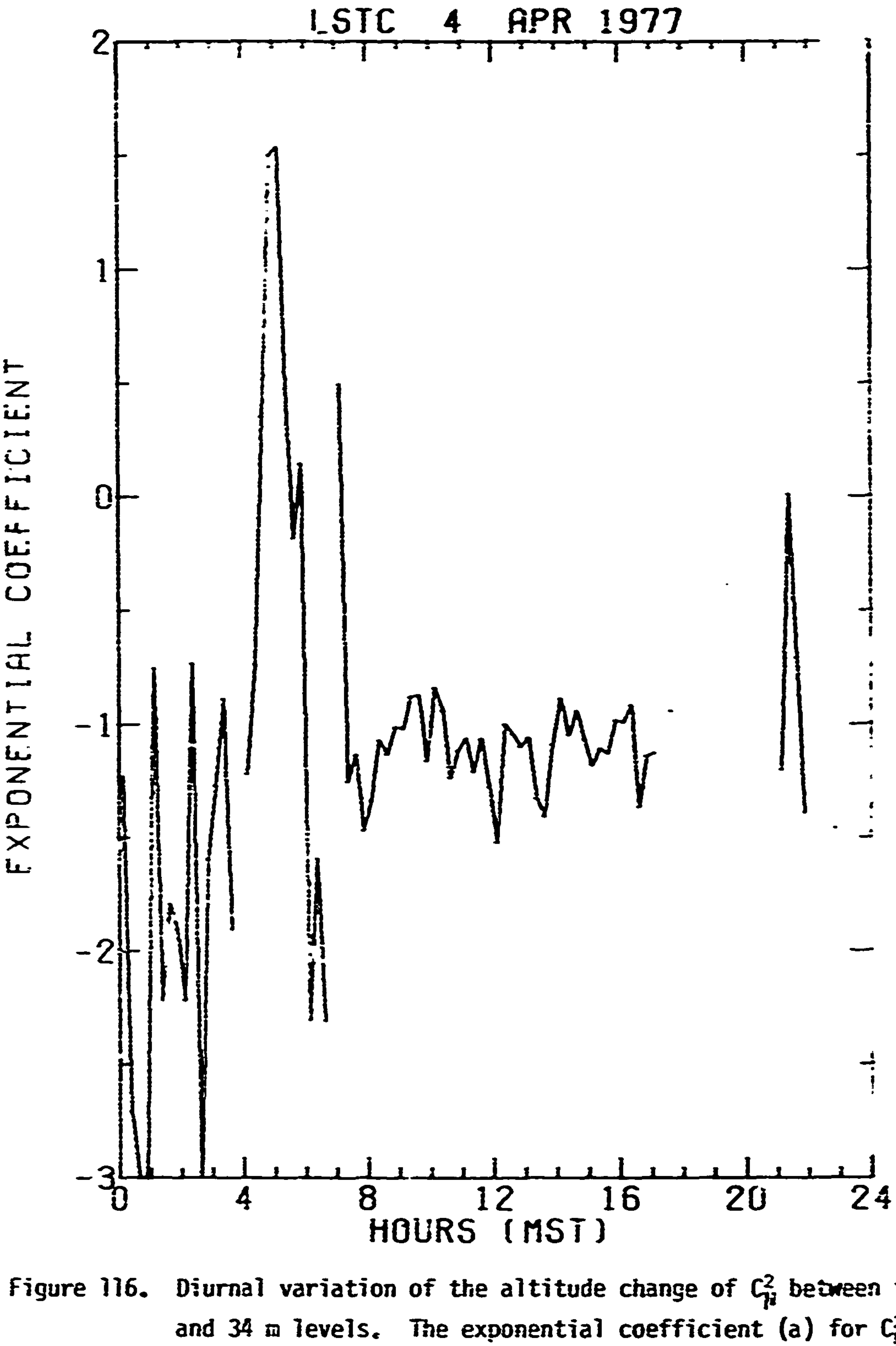


Figure 116. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 4 April 1977.

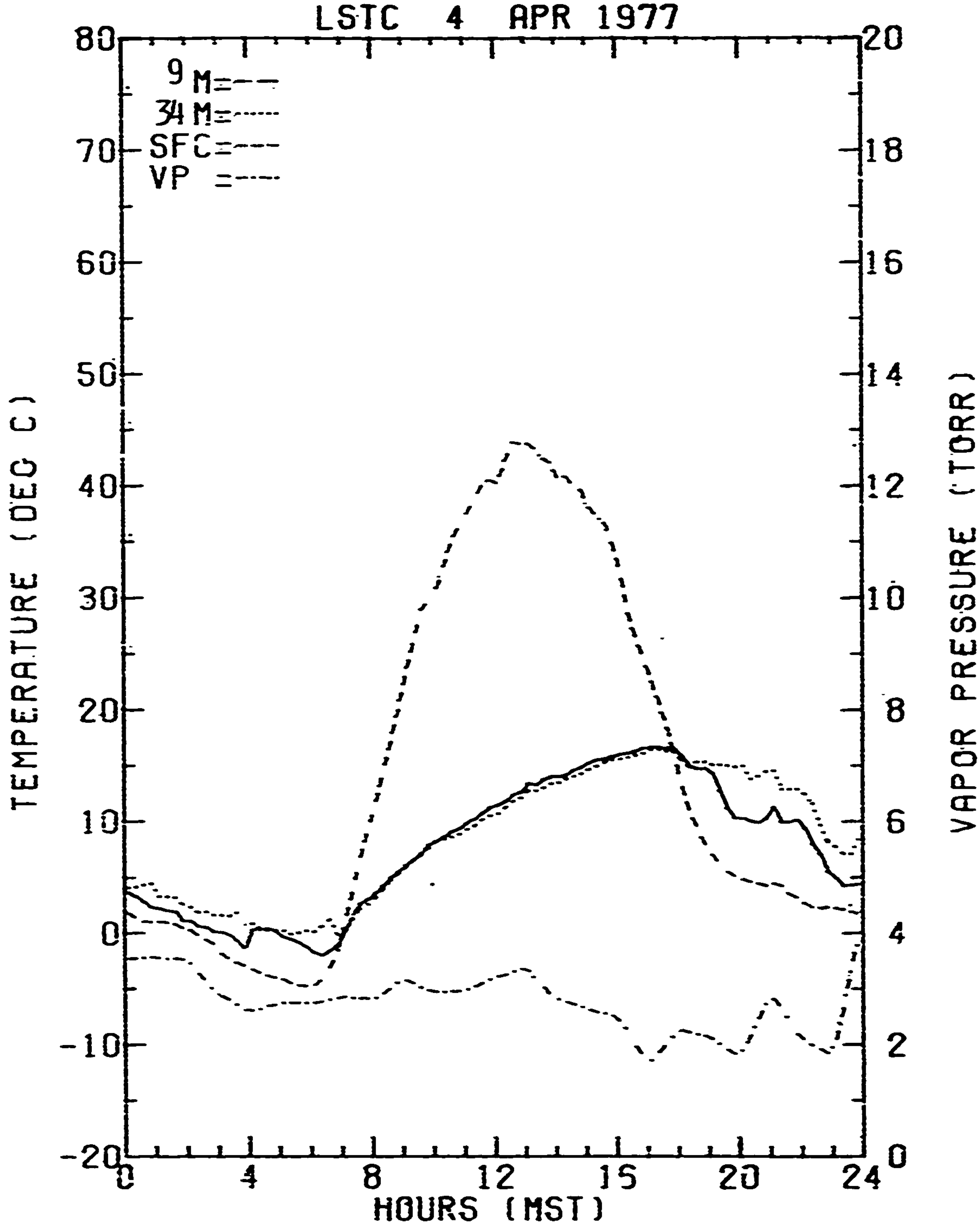


Figure 117. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 4 April 1977.

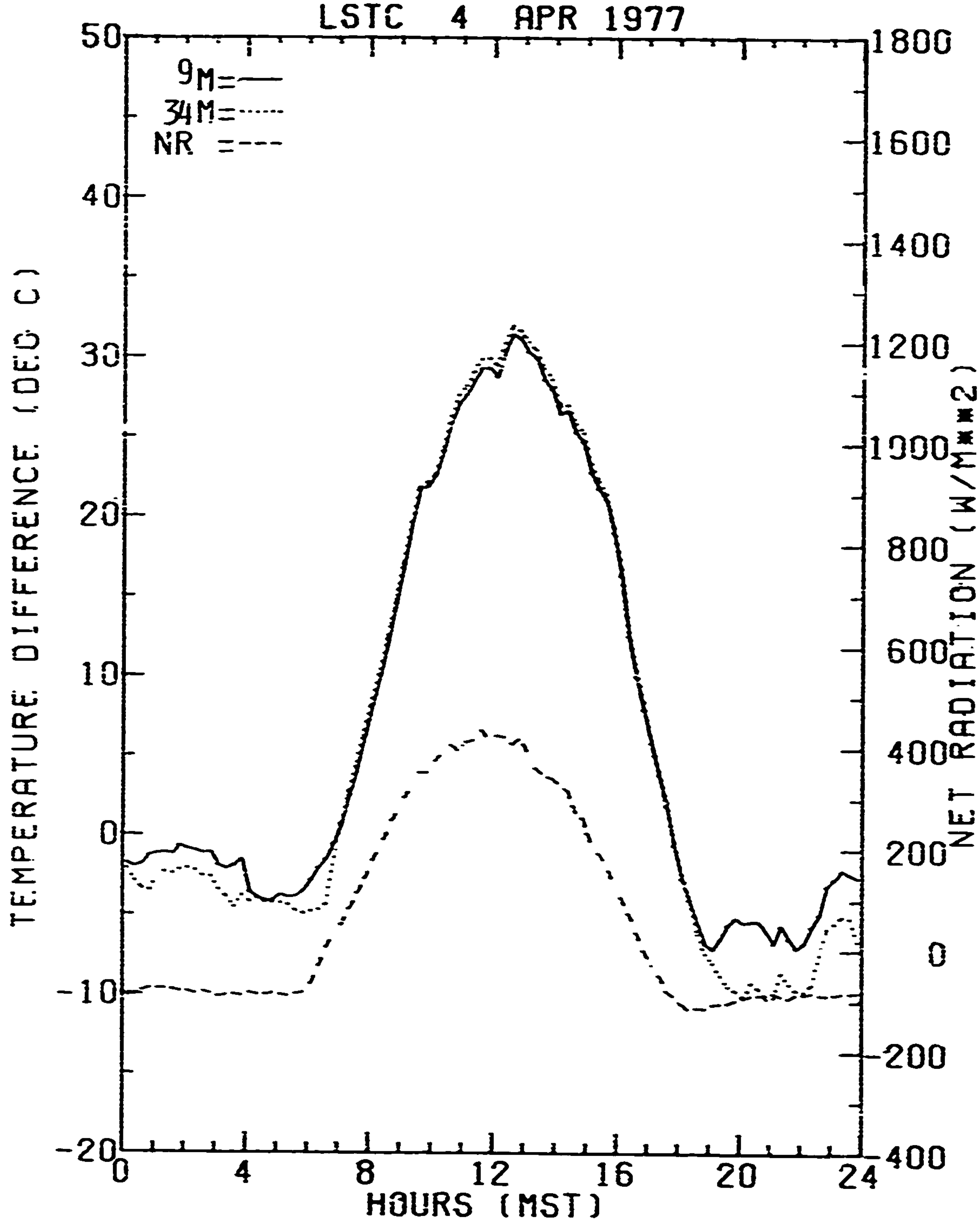


Figure 118. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 4 April 1977.

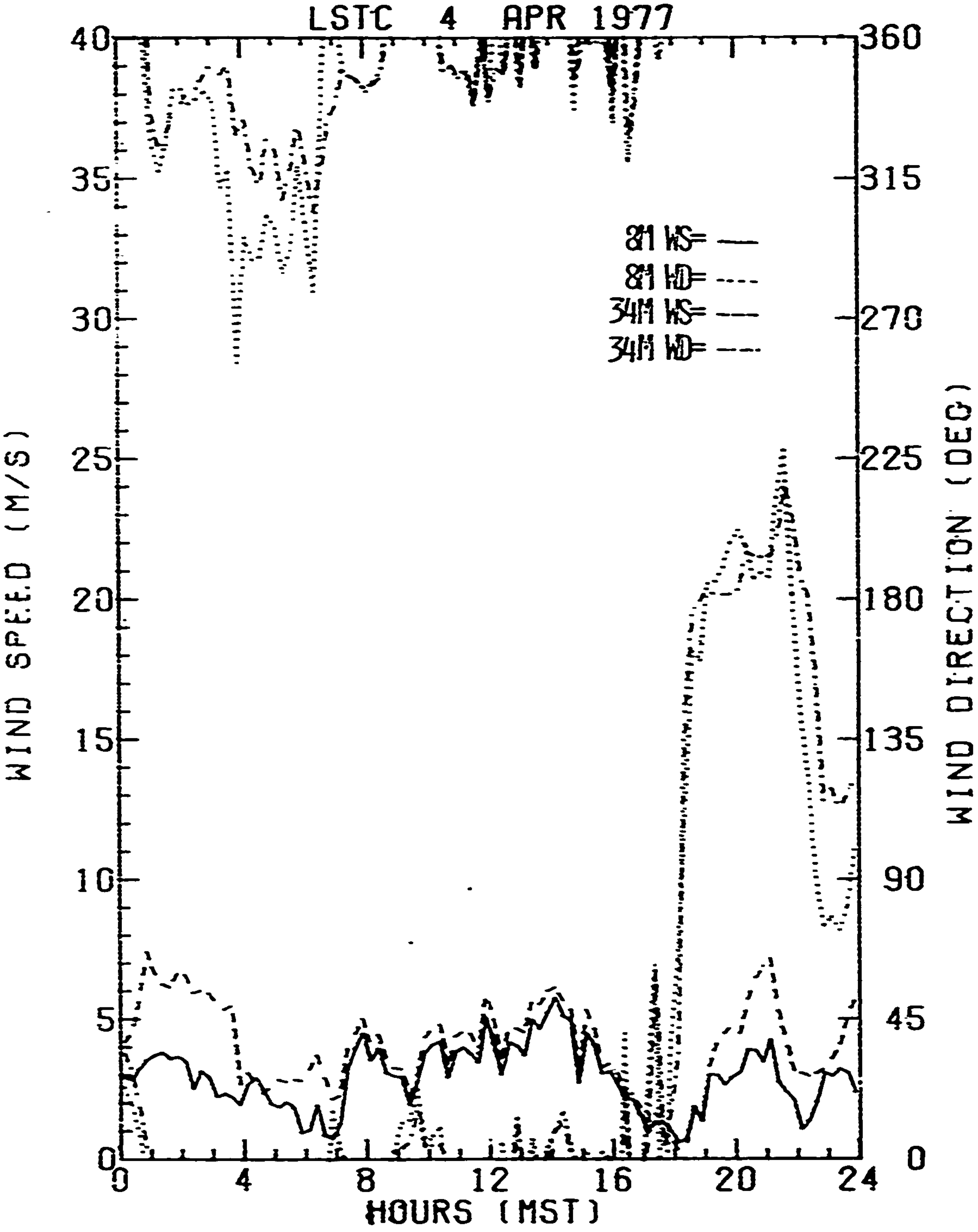


Figure 119. Dirunal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 4 April 1977.

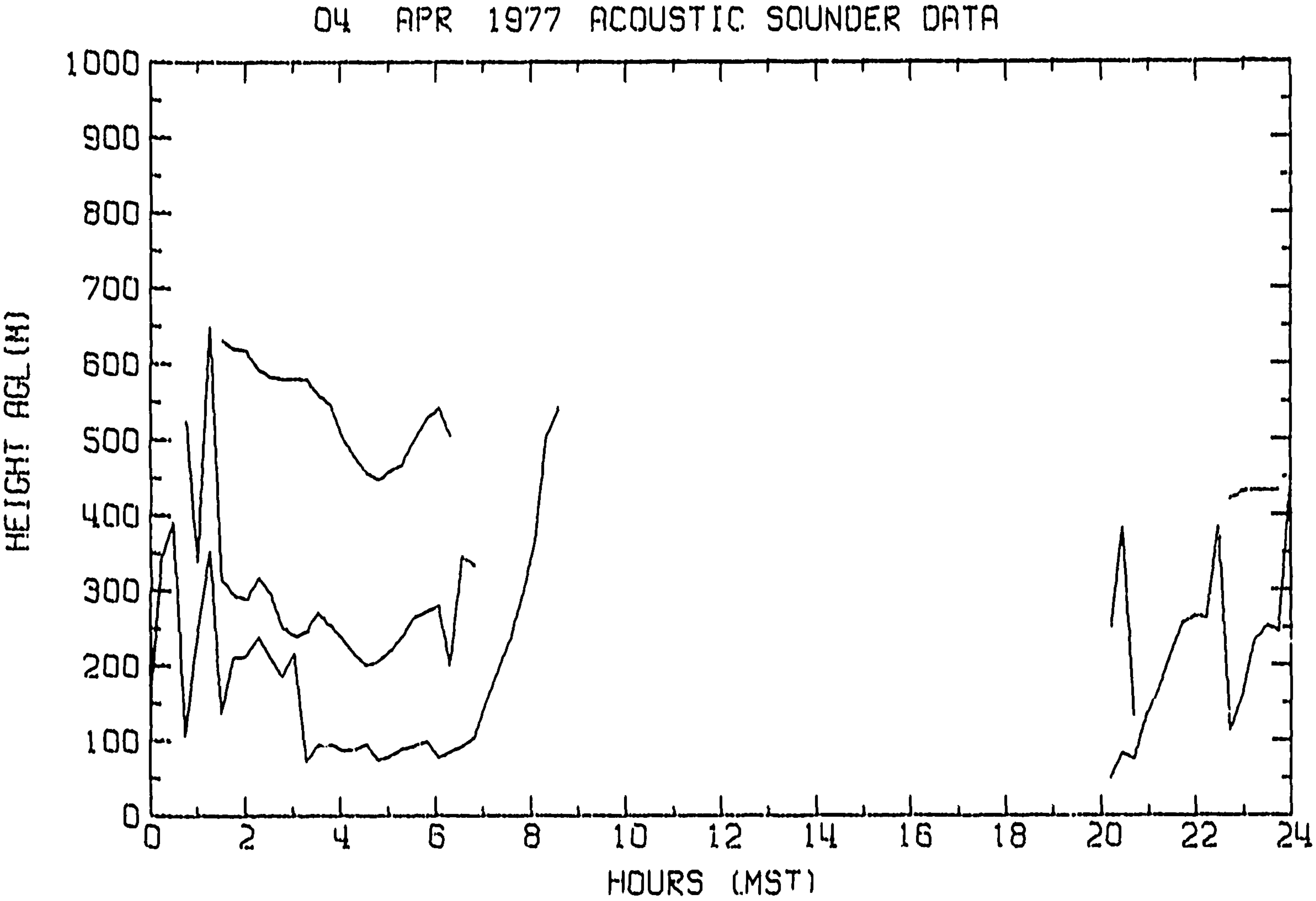


Figure 120. Inversion heights, LSTC, 4 April 1977.

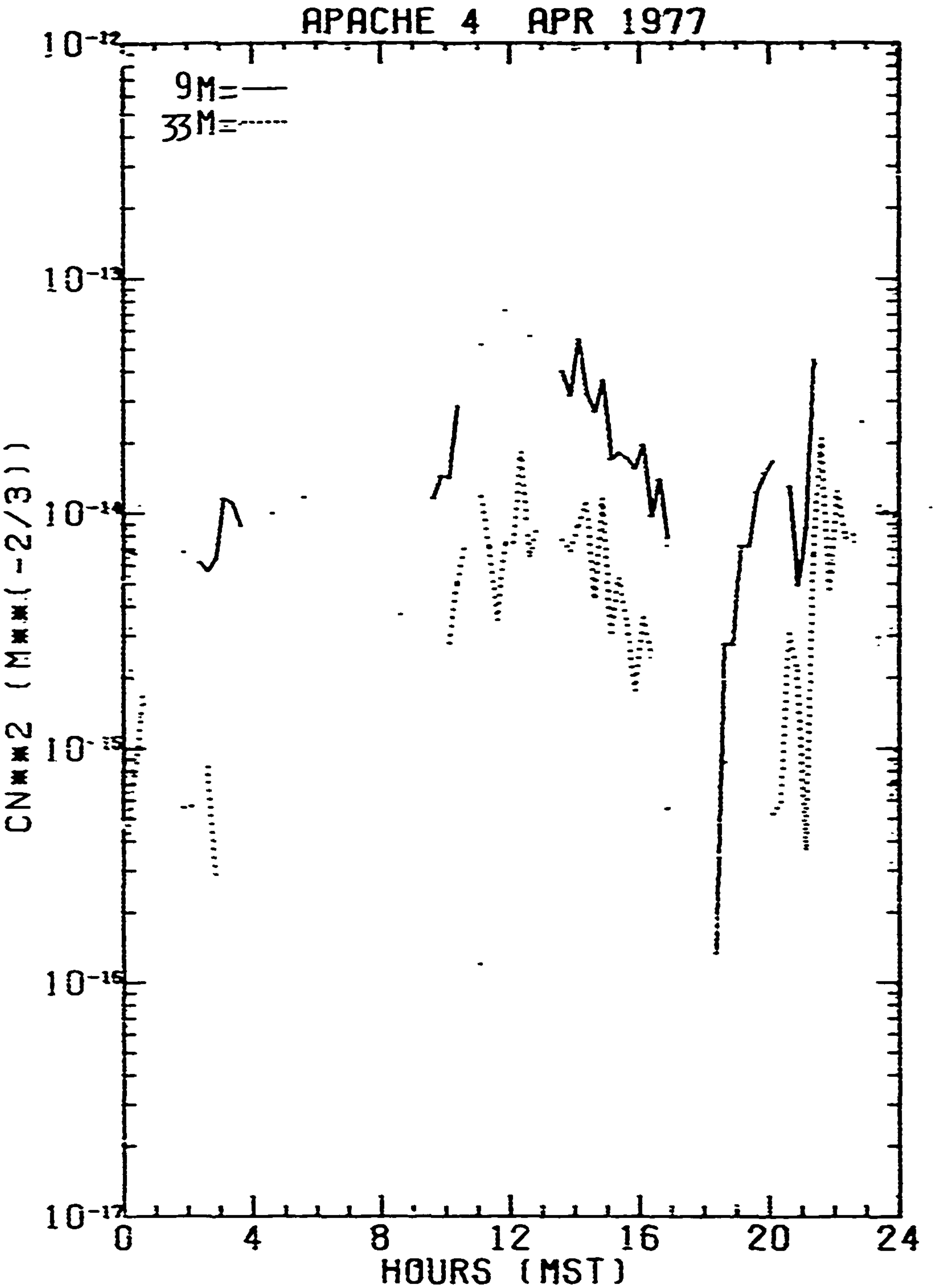


Figure 121. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 4 April 1977.

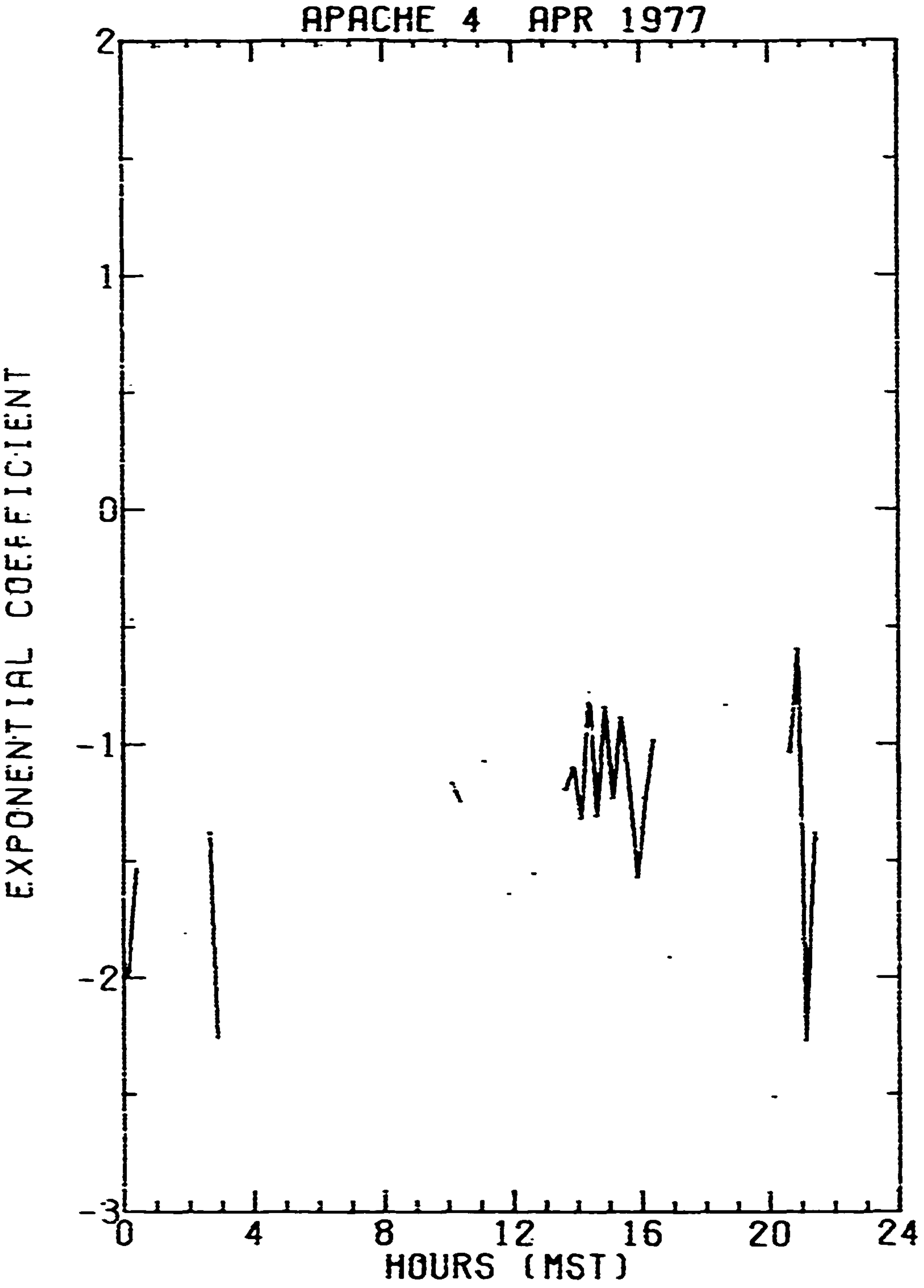


Figure 122. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 4 April 1977.

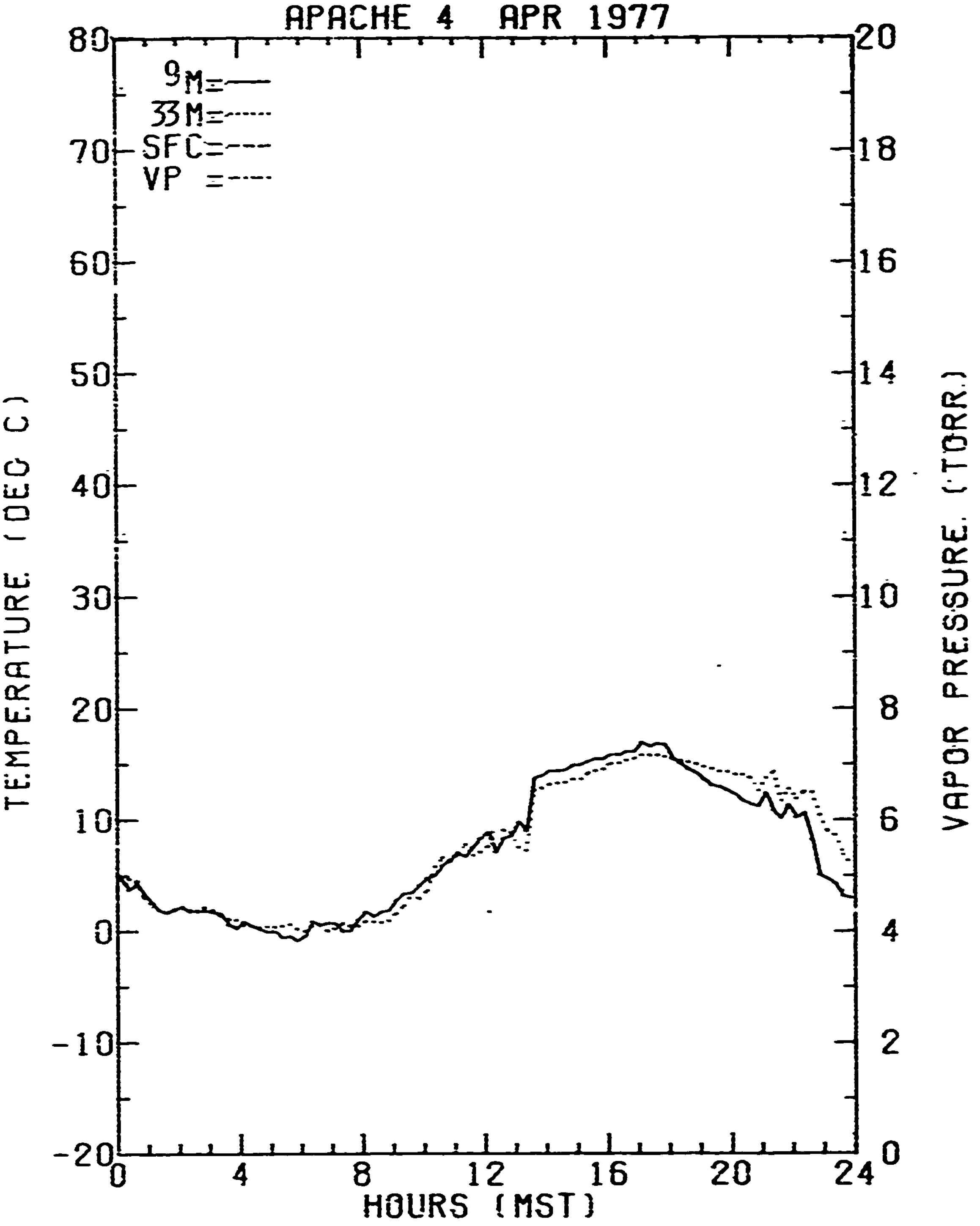


Figure 123. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 4 April 1977.

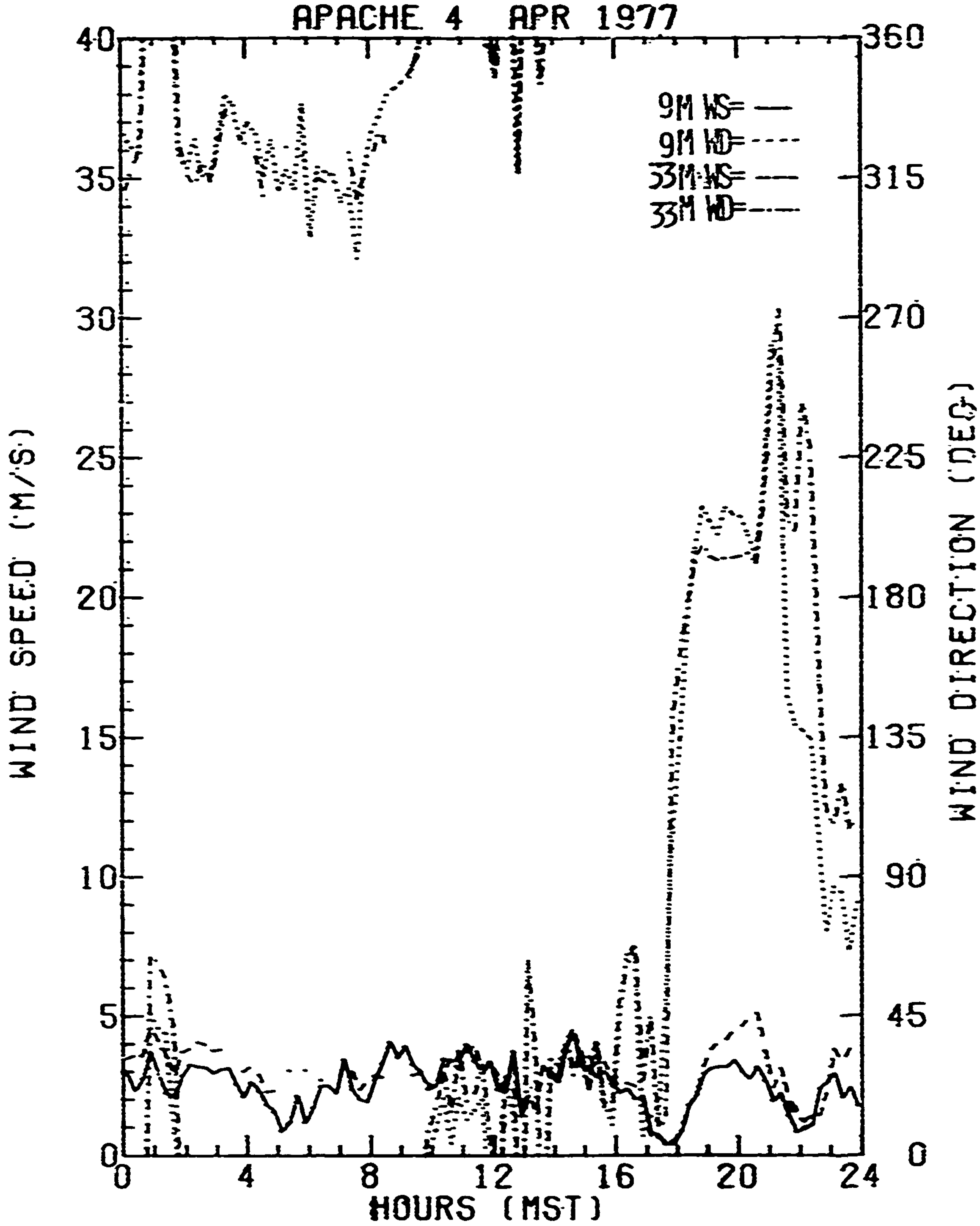


Figure 124. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 4 April 1977.

TABLE 69
APACHE SITE RAWINSONDE DATA

DATE: 04 APR 77 RELEASE NO.: 38 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	660.2	-.5	2.5	340.0	1.0
281.9	637.5	2.3	2.6	332.3	3.5
564.4	615.6	2.0	1.9	331.0	5.8
1825.6	525.0	-8.5	1.0	317.7	10.1
2967.1	452.5	-14.6	0.6	307.3	10.5
4365.0	375.0	-24.6	0.2	351.1	14.4

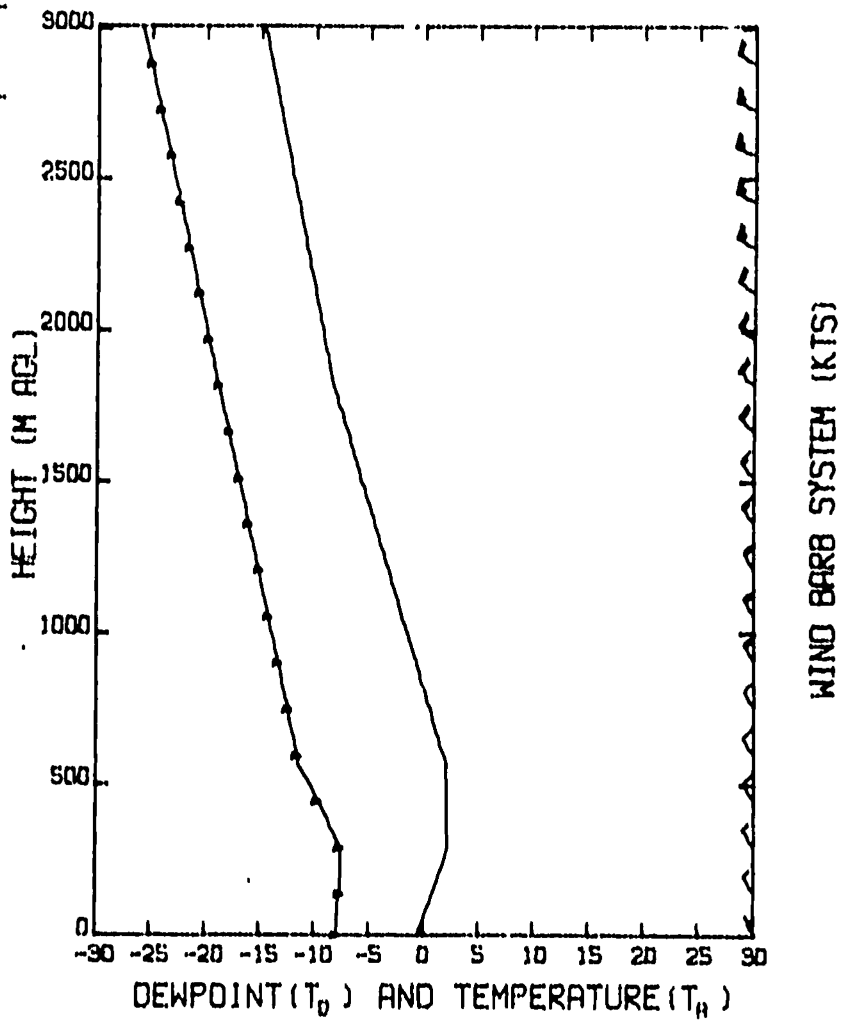


TABLE 70
APACHE SITE RAWINSONDE DATA

DATE: 04 APR 77 RELEASE NO.: 39 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	662.0	11.6	2.8	360.0	4.1
312.7	637.5	6.3	2.1	339.2	4.2
1146.5	575.1	-1.1	1.6	320.1	8.1
1868.0	525.0	-5.9	1.1	348.0	13.0
2281.8	498.0	-6.5	1.0	338.7	13.5
3900.0	403.2	-17.7	0.4	357.3	19.7

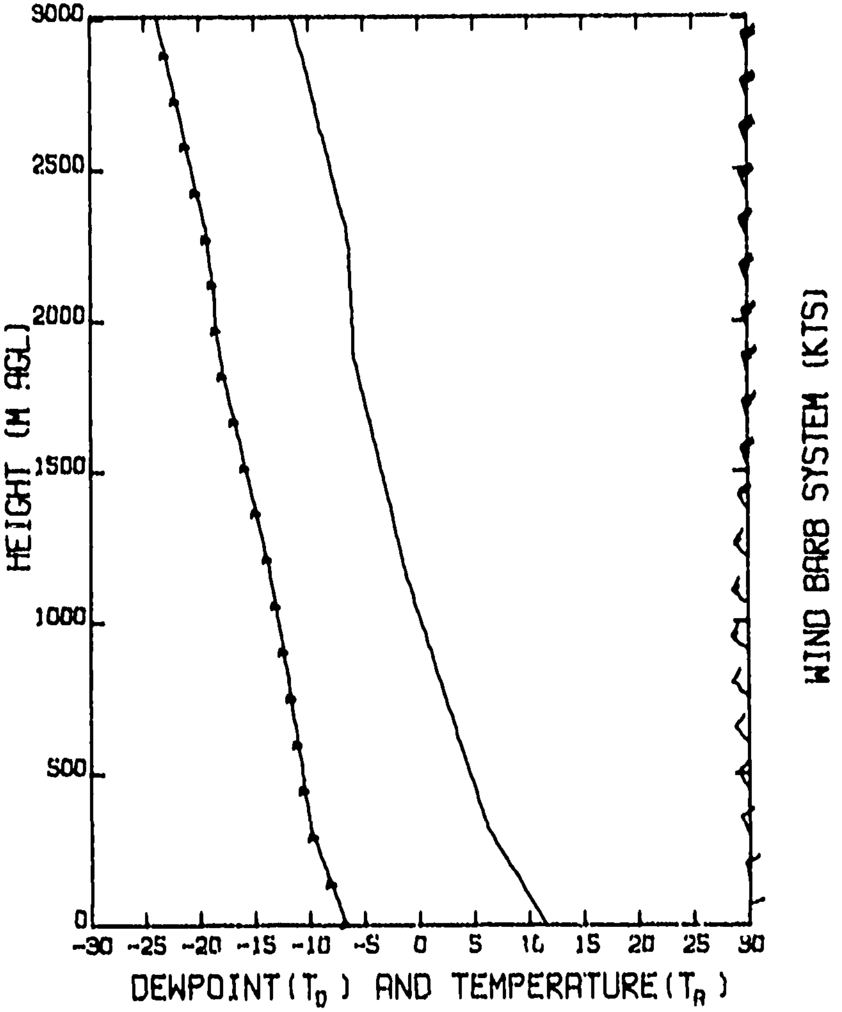


TABLE 71
APACHE SITE RAWINSONDE DATA

DATE: 04 APR 77 RELEASE NO.: 40 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	660.2	16.5	2.5	0.0	0.0
296.8	637.5	14.3	2.8	348.0	0.2
1893.8	525.0	-.3	1.5	322.5	11.2
2340.5	496.3	-3.9	1.1	325.4	13.8
2672.0	475.9	-4.4	1.1	334.1	12.3
3039.7	454.2	-6.5	0.9	337.7	12.9

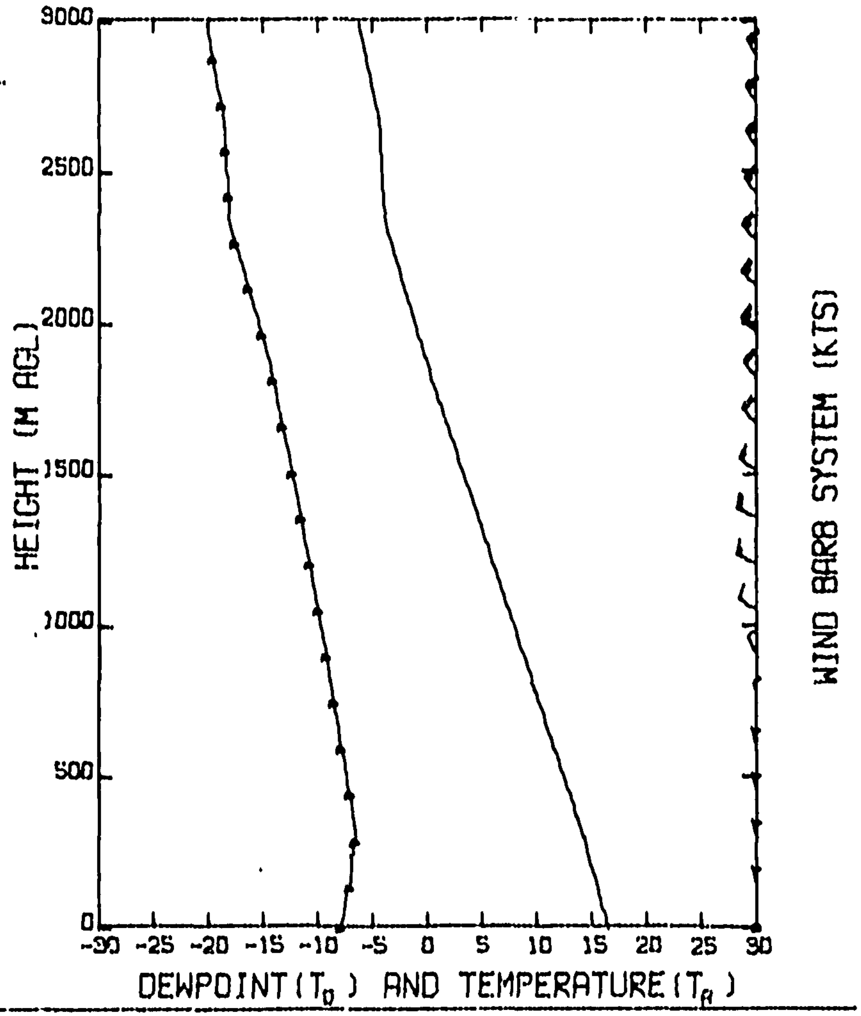
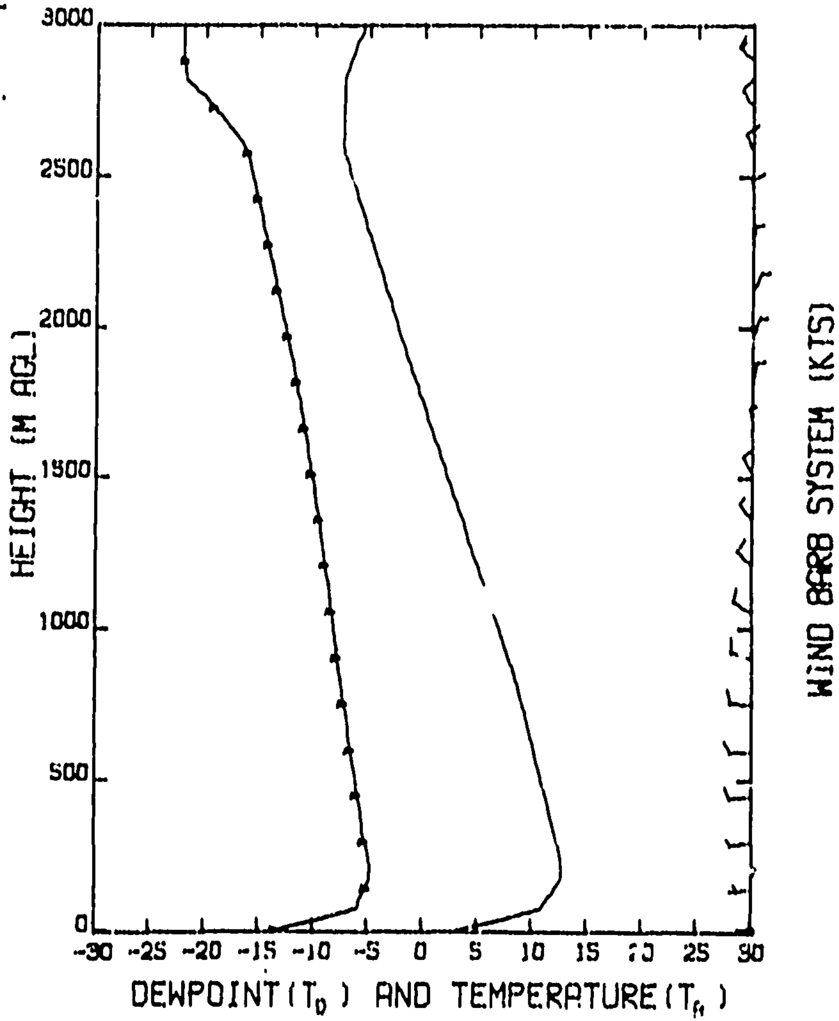


TABLE 72
APACHE SITE RAWINSONDE DATA

DATE: 04 APR 77 RELEASE NO. 41 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	662.5	3.2	1.6	0.0	0.0
73.9	656.5	10.9	2.9	263.5	0.7
175.9	648.6	12.9	3.2	263.5	1.5
320.7	637.5	12.0	3.0	263.5	2.9
827.4	599.8	8.5	2.6	284.5	5.1
1910.2	525.0	-1.6	1.8	17.1	2.6
2587.5	481.8	-7.5	1.3	339.9	5.4
2829.4	467.1	-7.2	0.8	321.9	7.2
3161.9	447.7	-3.8	0.8	312.6	10.1



Weather Summary

Date: 5 April 1977

Synoptic

Surface: Weak pressure gradients over southwestern United States.

500 Millibar: Pressure ridge moving eastward into western United States with moderate northwesterly flow over New Mexico.

Holloman AFB

Clouds: Clear.

Wind: Light and variable with peak wind of 6 m sec^{-1} from the south observed shortly before noon.

Visibility: Greater than 60 km.

Maximum temperature:	22.2°C	Corresponding vapor pressure:	2.9 Torr
Minimum temperature:	1.1°C	Corresponding vapor pressure:	2.0 Torr

Figure 125a. Surface weather map for 5 April 1977.

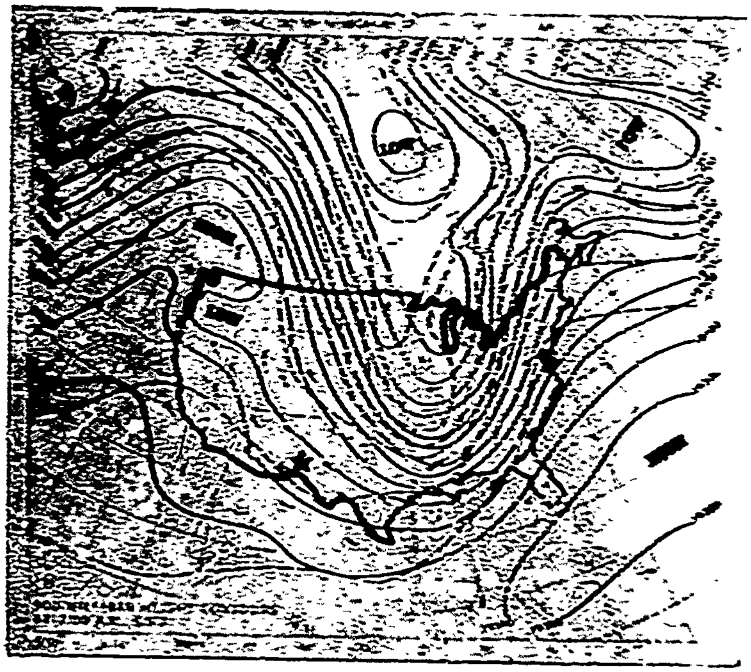


Figure 125b. 500-millibar height contours for 5 April 1977.

TABLE 73. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Date: 5 April 1977

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Remarks
0100	0.3	1.8	-12.5	0	0	0	
0200	-0.9	1.8	-11.9	0	0	0	
0300	-1.9	1.5	-14.9	0	0	0	
0400	-0.6	2.3	-9.1	0	0	0	
0500	-3.5	1.4	-15.2	0	0	0	
0600	-2.0	1.7	-12.4	0	0	0	
0700	5.8	2.0	-10.7	0	0	0	
0800	10.6	3.6	-3.2	0	0	0	
0900	13.0	3.2	-4.2	0	0	0	
1000	14.9	3.1	-5.0	0	0	0	Apache dn for cal. 1032-1101-nal both ΔT's - all else ok
1100	17.3	3.1	-5.1	0	0	0	
1200	18.3	3.2	-4.9	0	0	0	
1300	20.0	3.0	-5.6	0	0	0	
1400	19.4	2.8	-6.6	0	0	0	
1500	21.2	2.9	-5.7	0	0	0	Cal LSTC ΔT's
1600	20.2	2.6	-7.4	0	0	0	
1700	20.4	2.5	-7.8	0	0	0	
1800	19.6	2.5	-8.0	0	0	0	
1900	15.6	2.2	-9.1	0	0	0	
2000	14.5	2.3	-8.9	0	0	0	
2100	11.9	2.3	-9.3	0	0	0	
2200	11.8	2.3	-8.6	0	0	0	
2300	6.2	2.1	-10.4	0	0	0	
2400	6.0	1.9	-11.2	0	0	0	

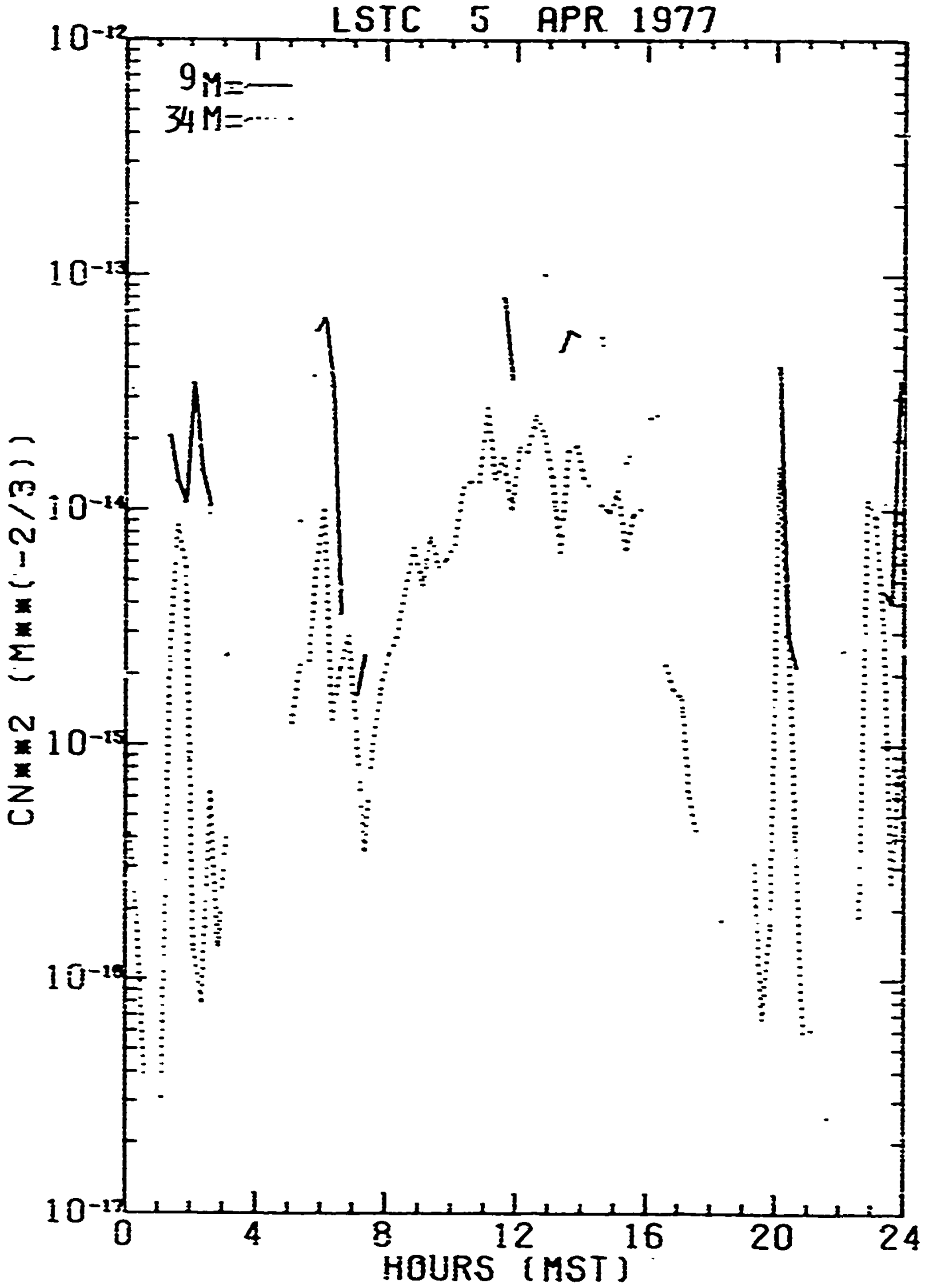


Figure 126. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 5 April 1977.

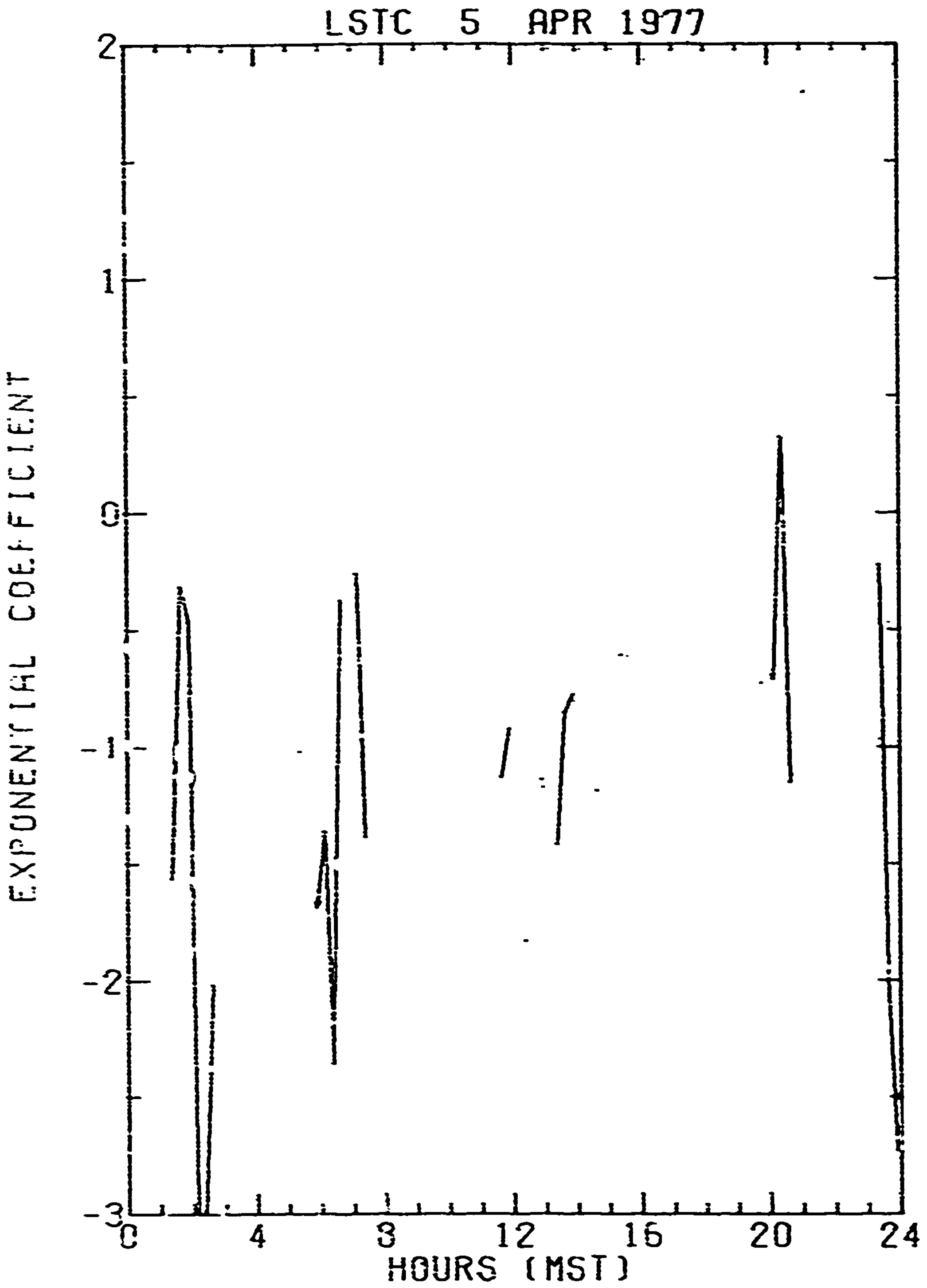


Figure 127. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 5 April 1977.

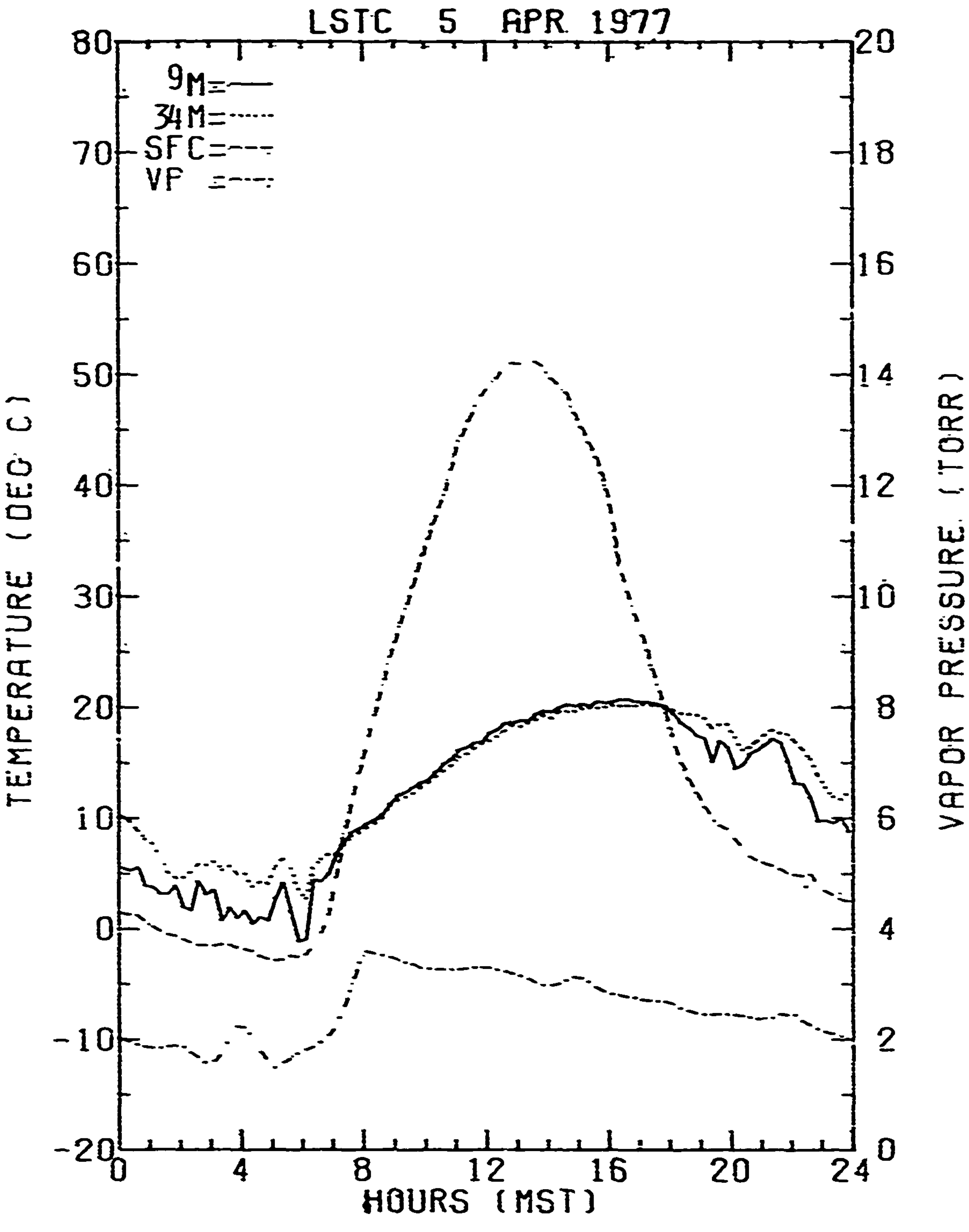


Figure 128. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 5 April 1977.

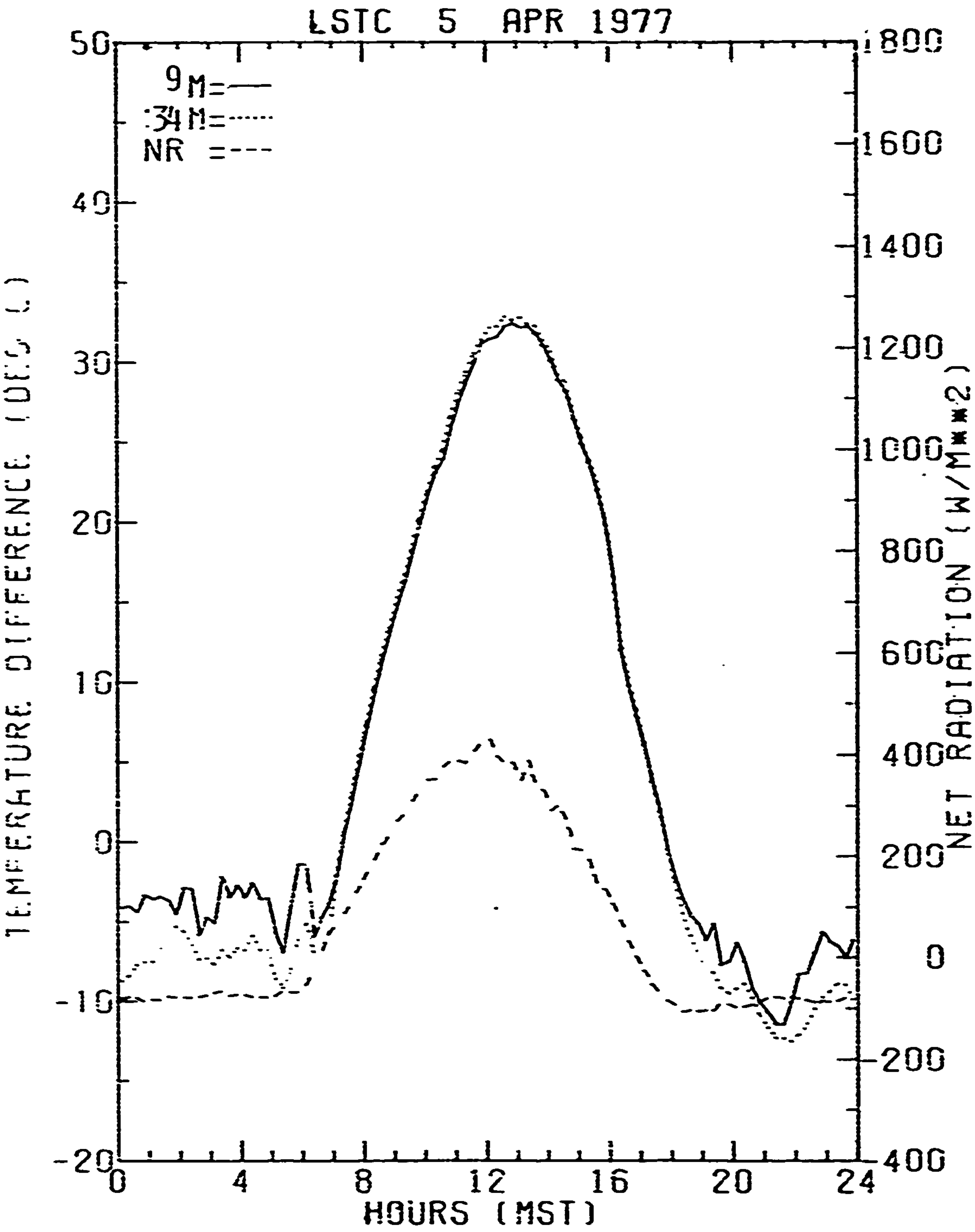


Figure 129. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 5 April 1977.

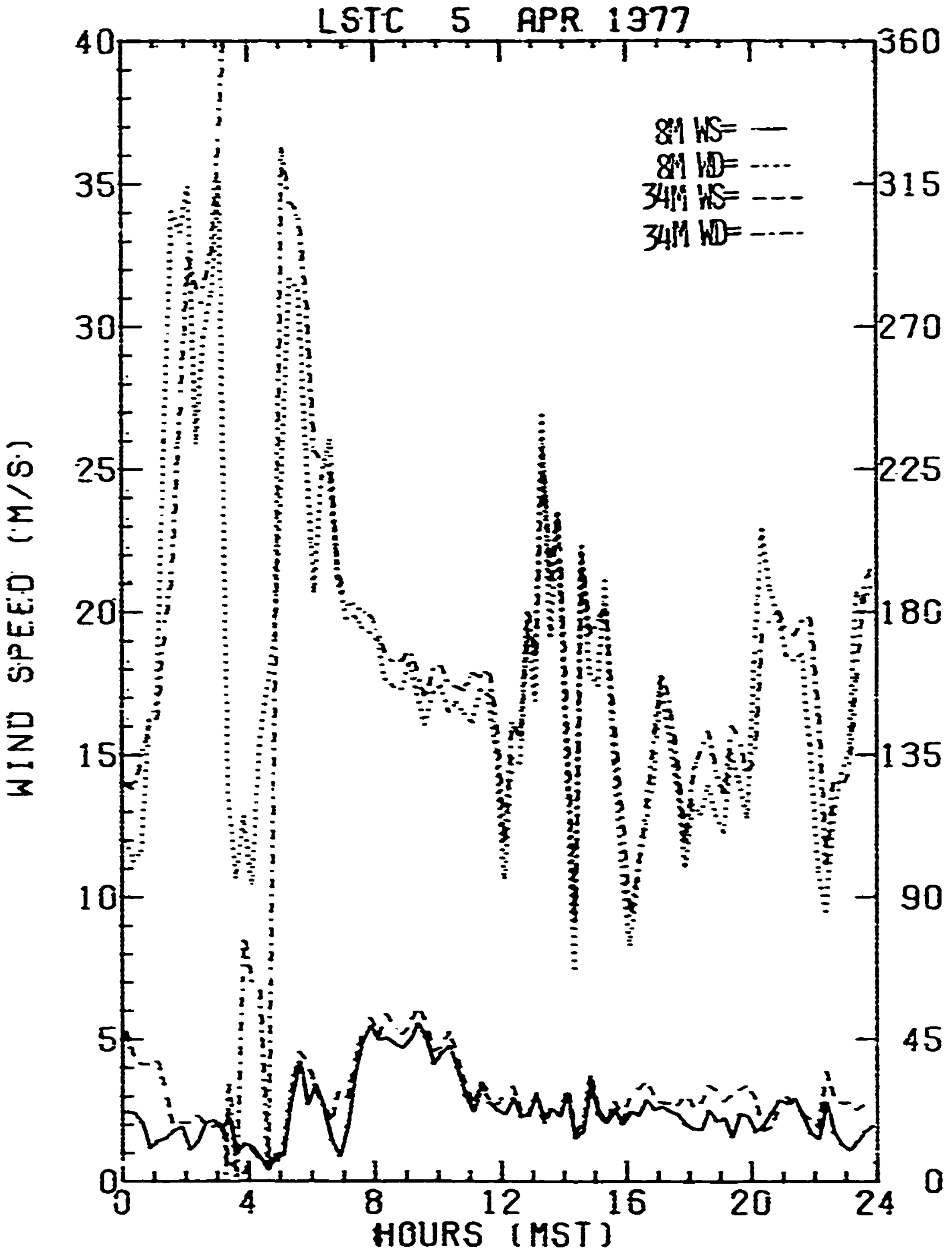


Figure 130. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 5 April 1977.

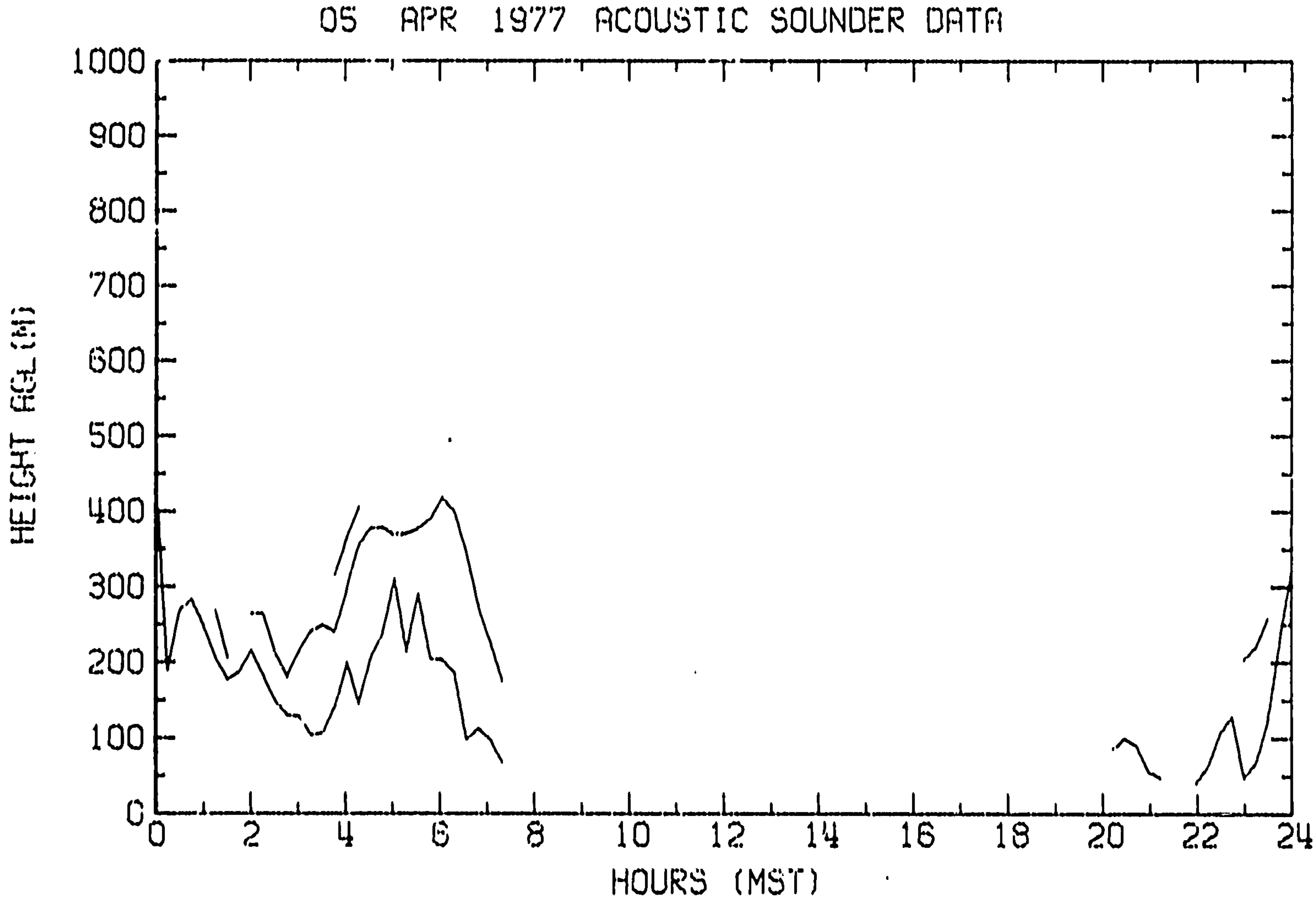


Figure 131. Inversion heights, LSTC, 5 April 1977.

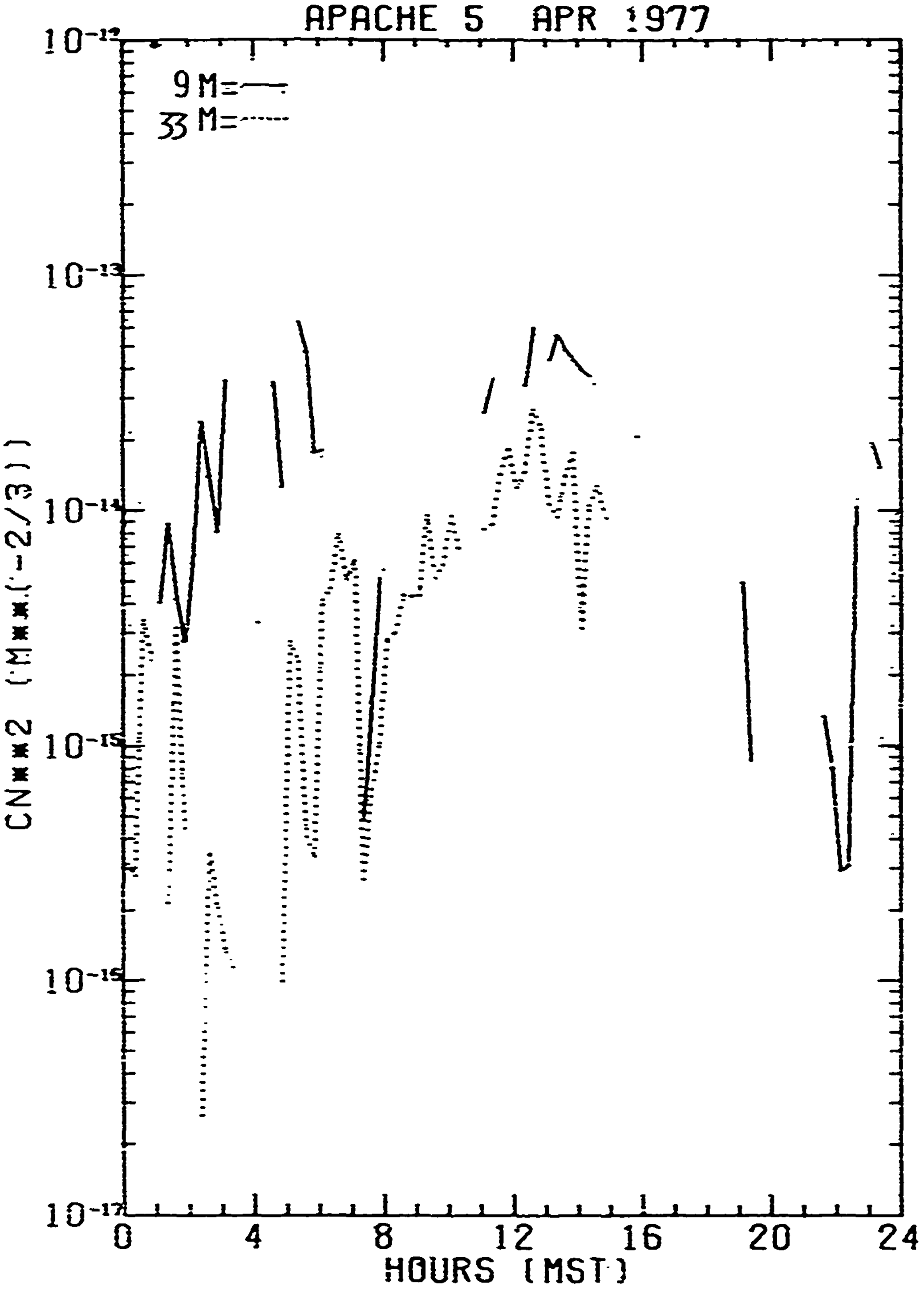


Figure 132. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 5 April 1977.

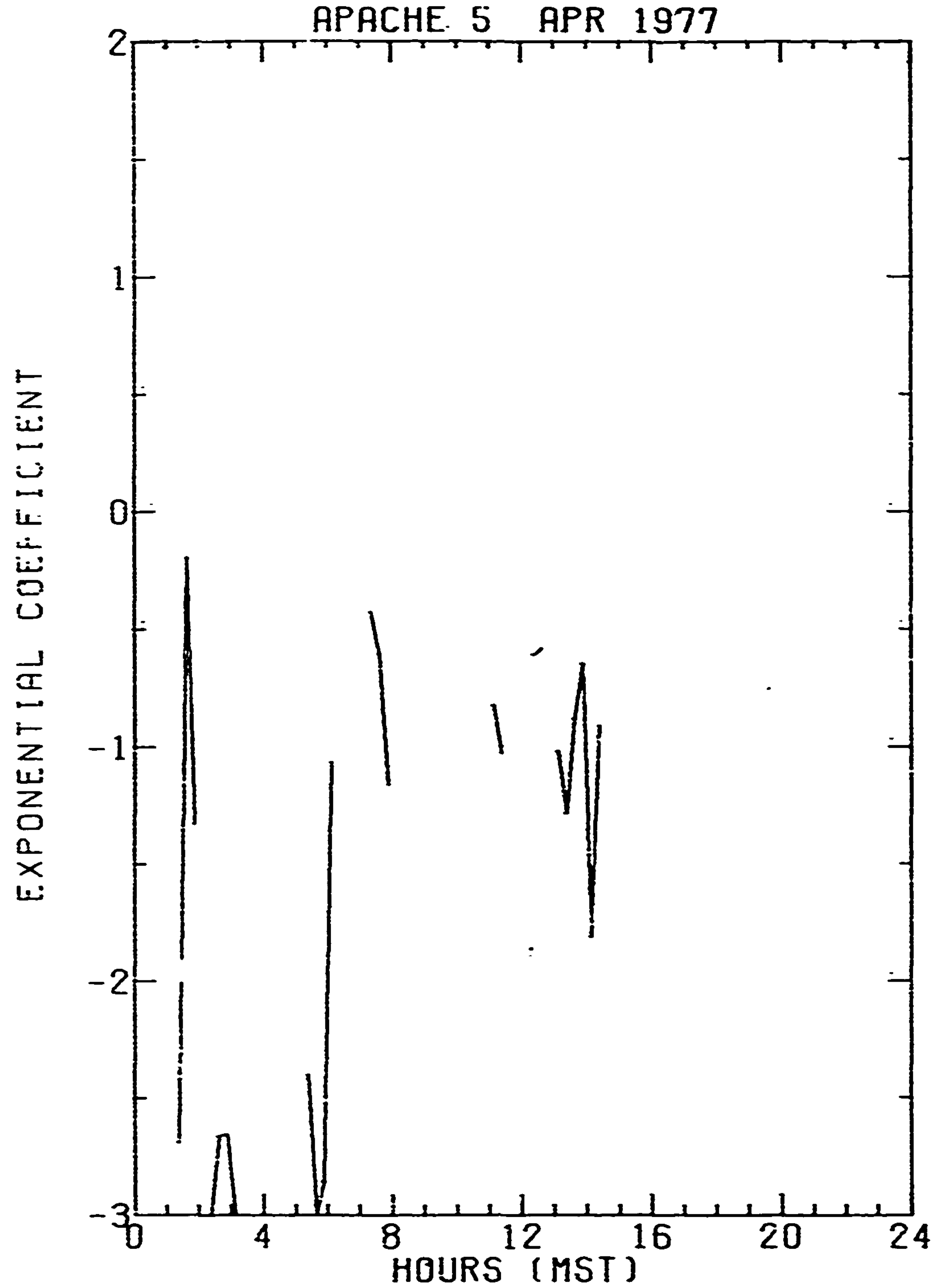


Figure 133. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 5 April 1977.

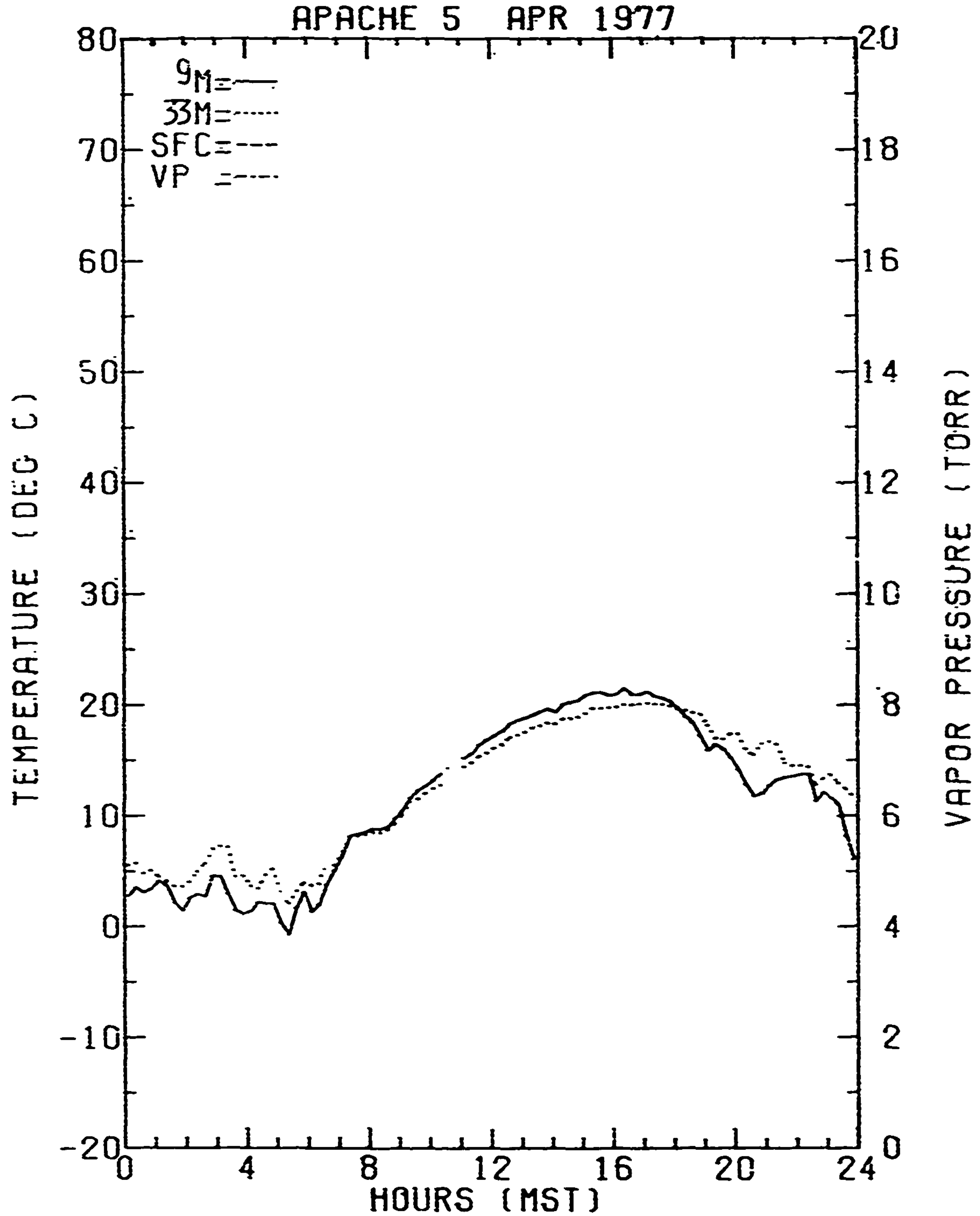


Figure 134. Dirunal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 5 April 1977.

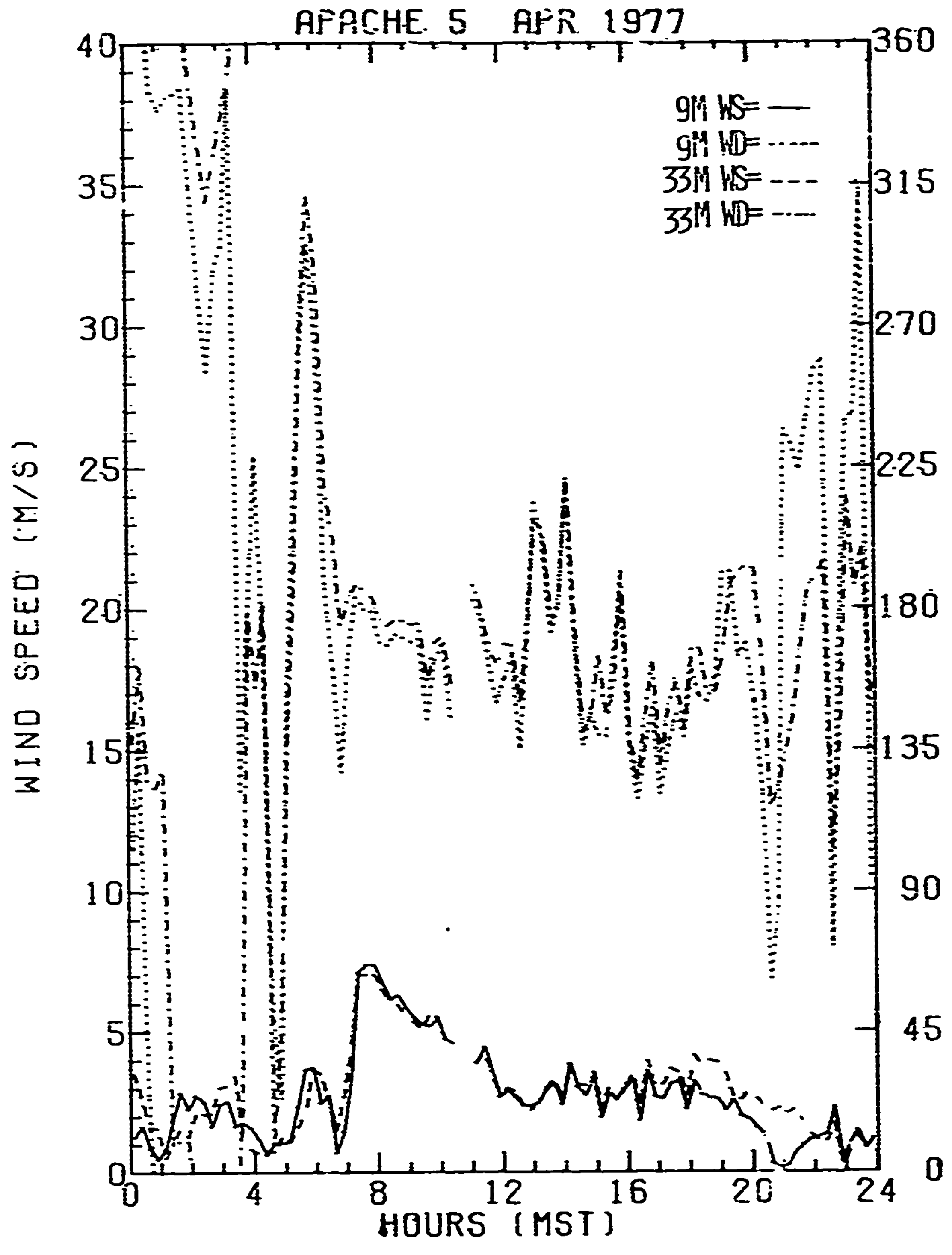


Figure 135. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 5 April 1977.

TABLE 74
APACHE SITE RAWINSONDE DATA

DATE: 05 APR 77 RELEASE NO.: 42 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	663 2	-1.0	1.4	0.0	0.0
35.7	660.3	5.8	2.2	0.0	0.0
590.2	637.5	6.4	2.2	0.0	0.0
444.7	628.2	7.6	2.4	0.0	0.0
998.5	587.2	5.6	2.4	0.0	0.0
1902.9	525.0	-2.2	1.6	0.0	0.0
2235.9	503.4	-4.3	1.5	0.0	0.0
2564.7	482.8	-4.9	1.0	0.0	0.0
2925.2	461.2	-4.9	0.8	0.0	0.0
3610.5	422.5	-8.7	0.6	0.0	0.0

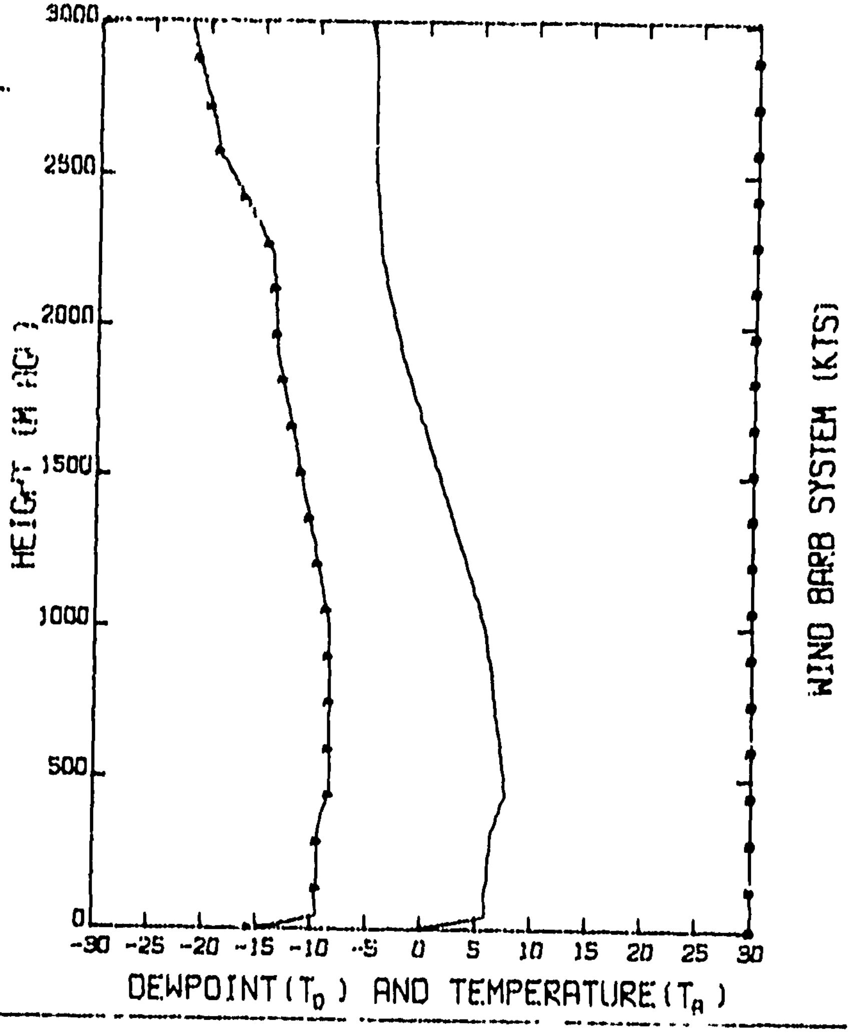


TABLE 75
APACHE SITE RAWINSONDE DATA

DATE: 05 APR 77 RELEASE NO. 43 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	664.0	17.5	3.0	0.0	0.0
346.3	637.5	14.3	2.6	184.4	1.3
979.3	590.8	6.7	2.2	213.5	2.5
1937.6	525.0	-.7	1.7	273.2	5.6
2308.0	501.1	-3.0	1.1	274.5	6.2
2631.5	481.0	-4.9	1.0	285.6	8.3
2876.1	466.3	-4.7	0.9	·294.2	9.4
3322.0	440.5	-8.0	0.7	301.3	9.5

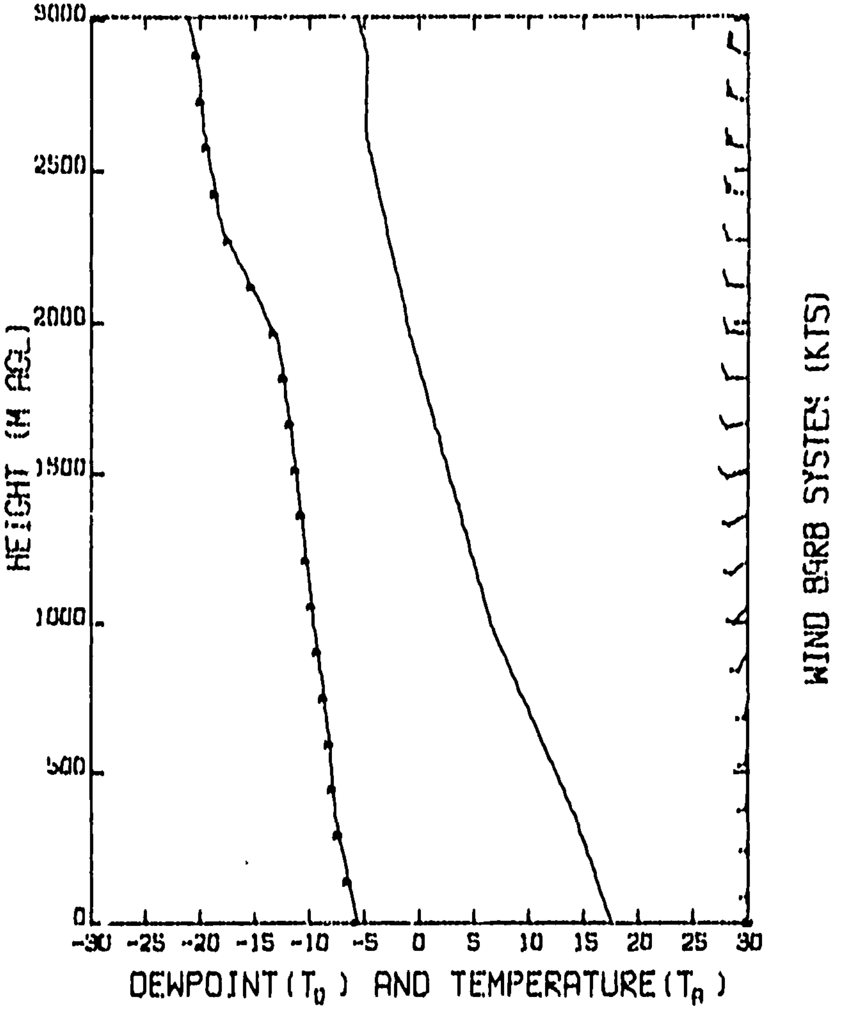


TABLE 76
APACHE SITE RAWINSONDE DATA

DATE: 05 APR 77 RELEASE NO. 44 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M MSL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	662.1	20.4	5.2	120.0	3.1
324.7	637.5	17.0	2.8	137.0	3.6
676.5	611.5	13.2	2.6	152.0	4.1
1338.6	564.7	6.8	2.1	152.0	3.1
1932.7	525.0	1.2	1.7	238.0	4.1
2437.3	492.9	-2.9	1.5	269.0	5.2
2900.0	465.0	-2.6	0.9	311.0	7.2
4154.5	395.7	-14.2	0.4	304.8	8.1

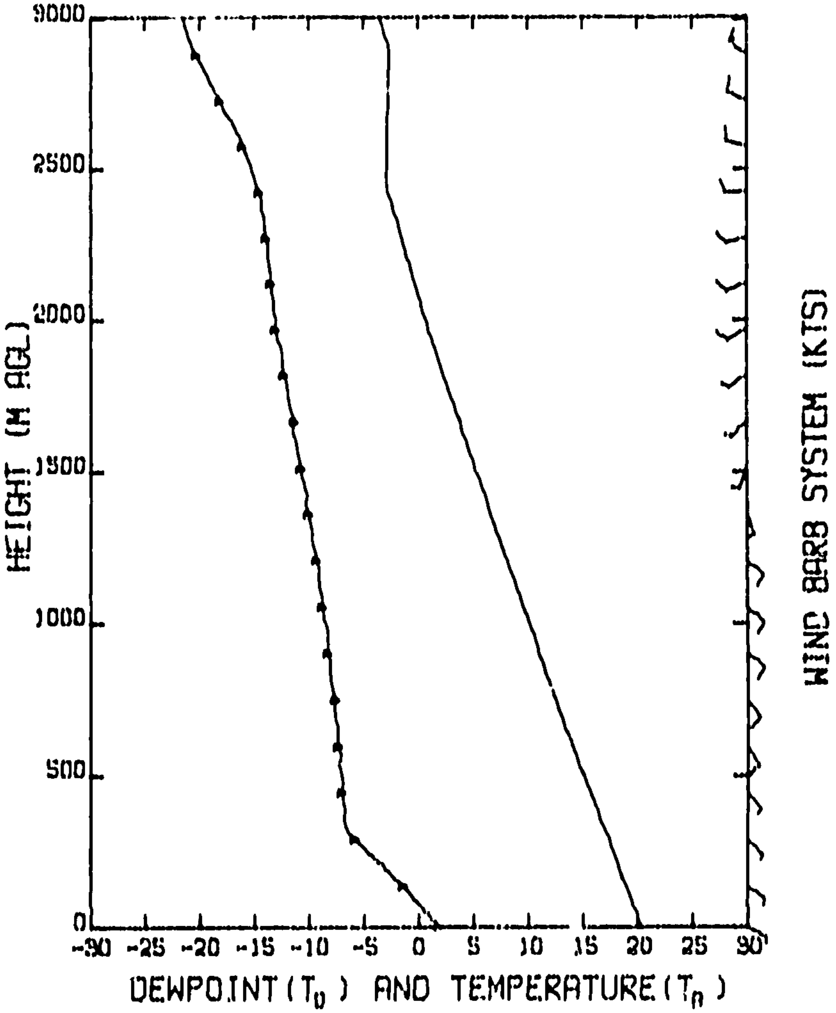
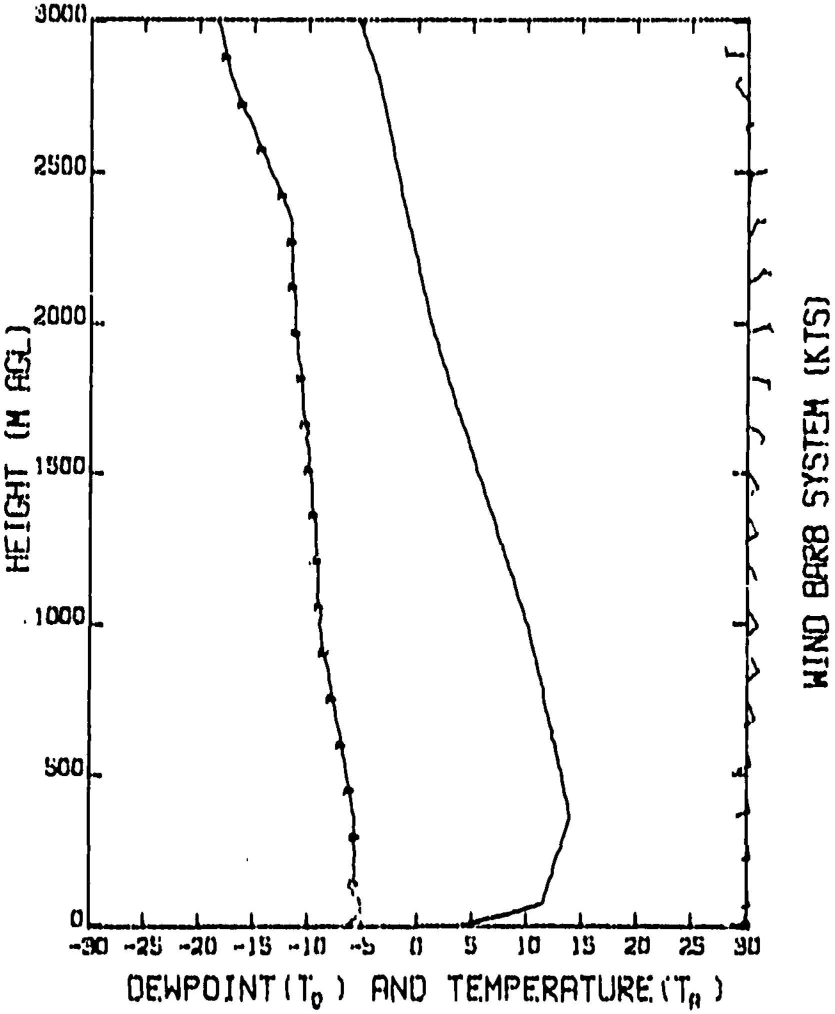


TABLE 77
APACHE SITE RAWINSONDE DATA

DATE: 05 APR 77 RELEASE NO.: 45 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	664.6	3.8	3.0	0.0	0.0
71.0	658.9	11.5	2.9	173.0	1.0
348.9	637.5	14.0	3.0	173.0	3.6
981.2	591.1	10.1	2.3	151.0	5.2
1953.4	525.0	1.5	1.9	72.0	2.6
2358.1	499.2	-1.1	1.9	16.0	4.1
2802.9	472.0	-3.6	1.2	307.0	2.1
3124.6	453.1	-6.6	1.0	247.2	3.9



Weather Summary

Date: 6 April 1977

Synoptic

Surface: Weak surface pressure gradient over New Mexico.

500 Millibar: Weak ridge over western United States with light northwesterly flow over New Mexico.

Holloman AFB

Clouds: Generally clear to thin scattered high clouds (cirrus) with few low clouds (cumulus) at 2000 m AGL during the afternoon.

Wind: Light and variable with peak gust of 8 m sec^{-1} from the east-southeast shortly before 1400 MST.

Visibility: Generally greater than 60 km.

Maximum temperature: 26.7°C   Corresponding vapor pressure: 2.9 Torr

Minimum temperature: 5.0°C   Corresponding vapor pressure: 2.5 Torr

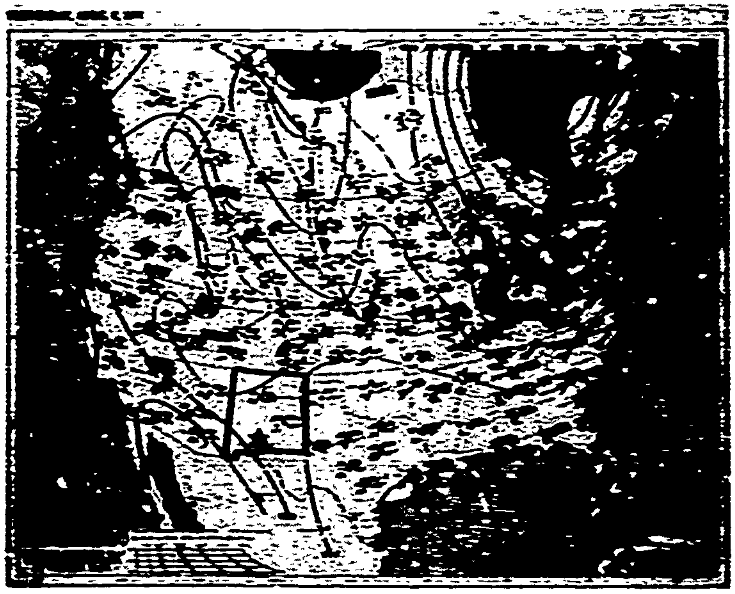


Figure 136a. Surface weather map for 6 April 1977.

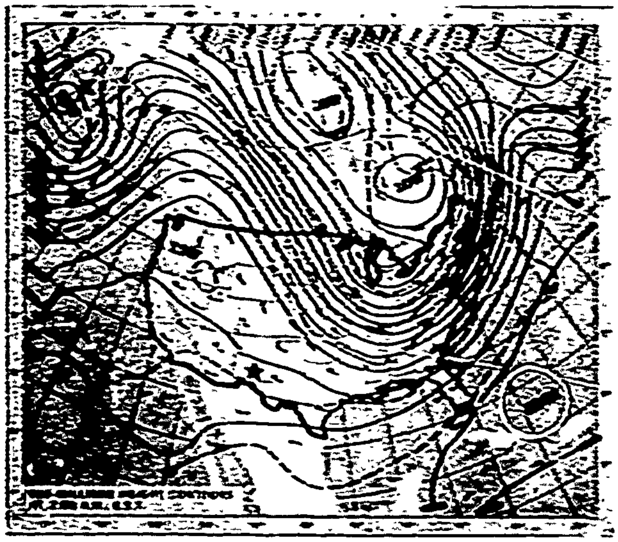


Figure 136b. 500-millibar height contours for 6 April 1977.

TABLE 78. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 6 April 1977 Remarks
0100	4.7	1.6	-13.4	0	0	0	
0200	4.9	1.6	-13.5	0	0	0	System crashed/reprogrammed and on at 0220 MST
0300	4.9	1.8	-12.3	0	0	0	Psychrometer broke (conversion tables in use)
0400	1.5	1.7	-12.6	0	0	0	
0500	-1.1	2.3	-9.1	0	0	0	
0600	-0.6	2.3	-9.1	0	0	0	
0700	6.1	2.8	-6.7	0	0	0	
0800	10.6	3.0	-5.3	0	0	0	
0900	14.9	2.7	-7.0	0	0	0	
1000	18.1	3.0	-5.4	0	0	0	
1100	20.6	3.2	-4.6	10 Cu	0	0	
1200	23.3	3.1	-5.3	10 Cu	0	0	Small Cu build up NE of station
1300	24.5	3.0	-5.8	10 Cu	0	0	
1400	24.8	2.9	-6.1	0	0	0	Few Cu NE
1500	25.3	2.7	-6.9	0	0	0	Few Cu NE
1600	25.1	2.5	-8.1	10 Cu	0	0	
1700	24.5	2.2	-9.5	0	0	10 Ci	
1800	22.8	2.1	-10.5	0	0	20 Ci	APA 32 AT back on line 1742
1900	19.1	1.6	-13.8	0	0	30 Ci	
2000	14.6	2.4	-8.7	0	0	30 Ci	
2100	11.4	2.3	-9.0	0	0	20 Ci	
2200	11.6	2.1	-10.5	0	0	10 Ci	
2300	11.4	2.5	-8.1	0	0	0	
2400	11.0	2.6	-7.7	0	0	0	

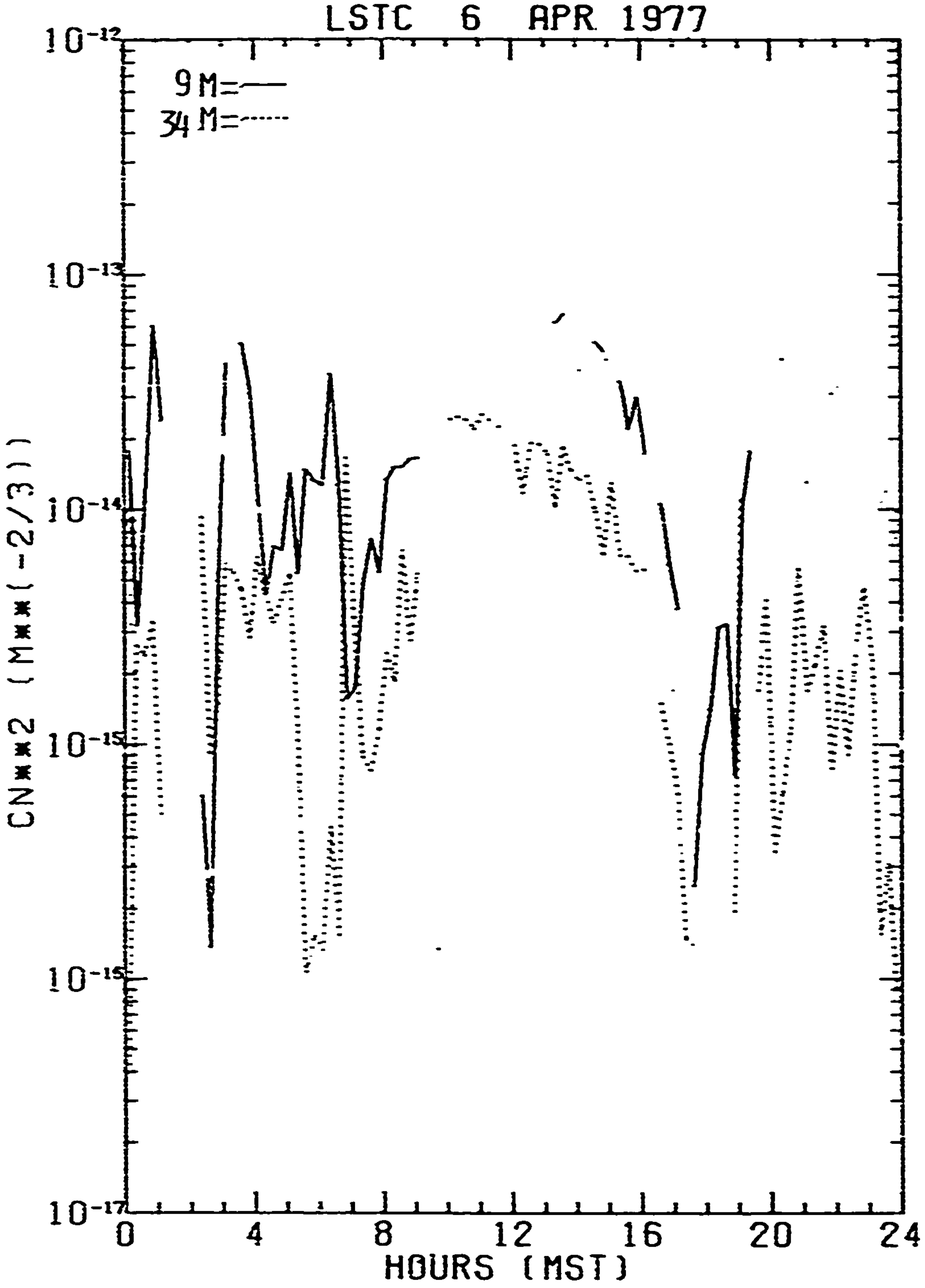


Figure 137. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 6 April 1977.

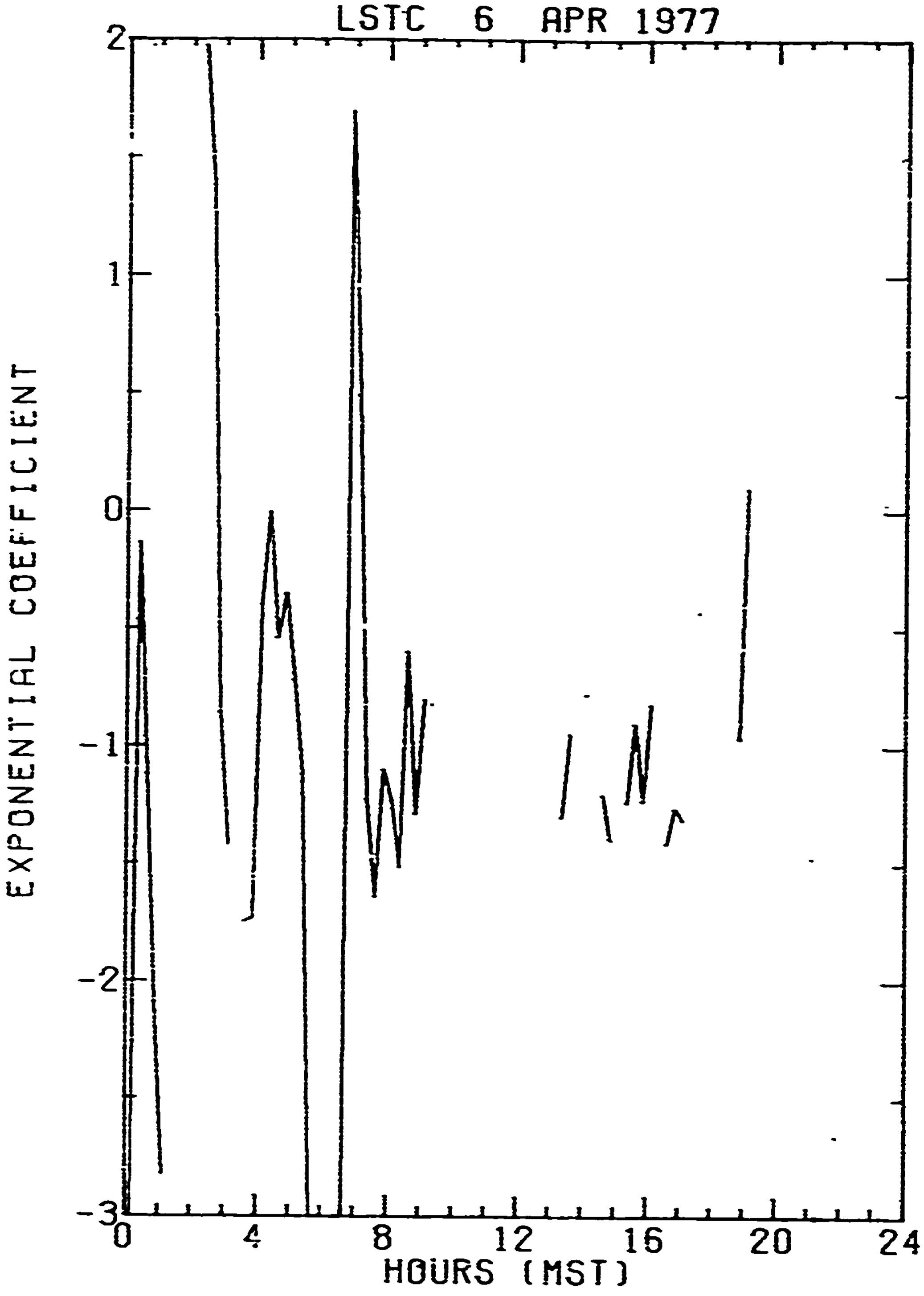


Figure 138. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 6 April 1977.

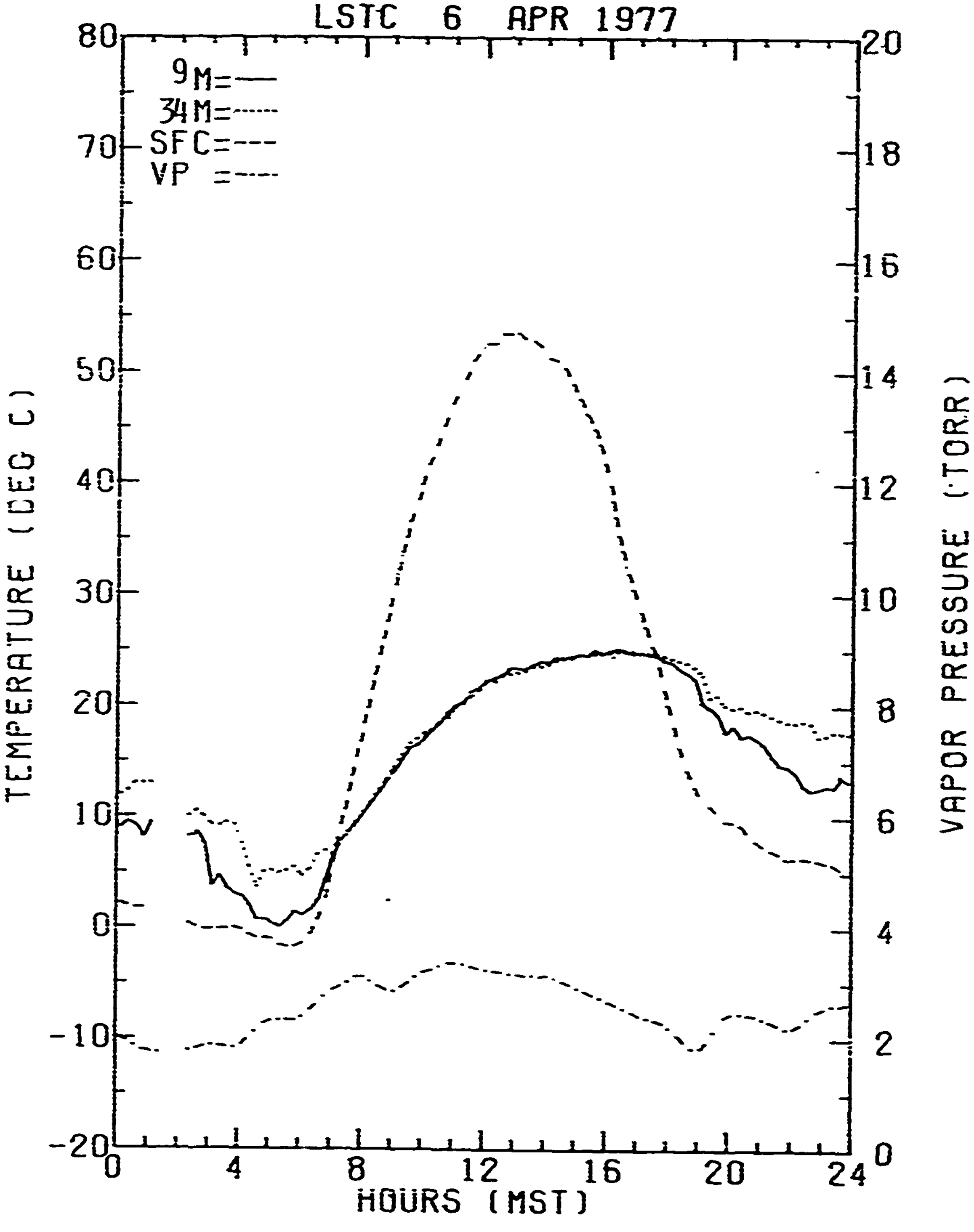


Figure 139. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 6 April 1977.

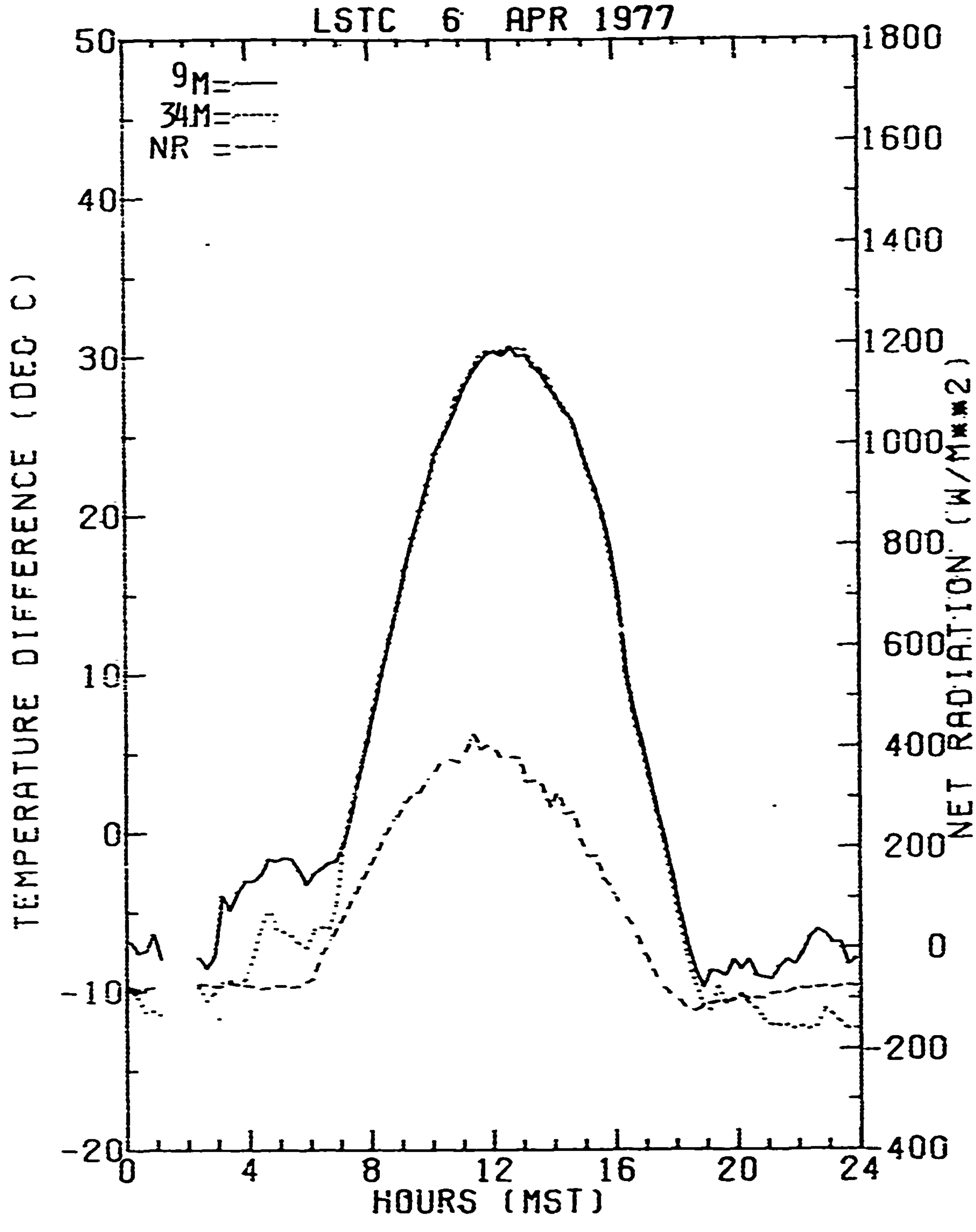


Figure 140. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 6 April 1977.

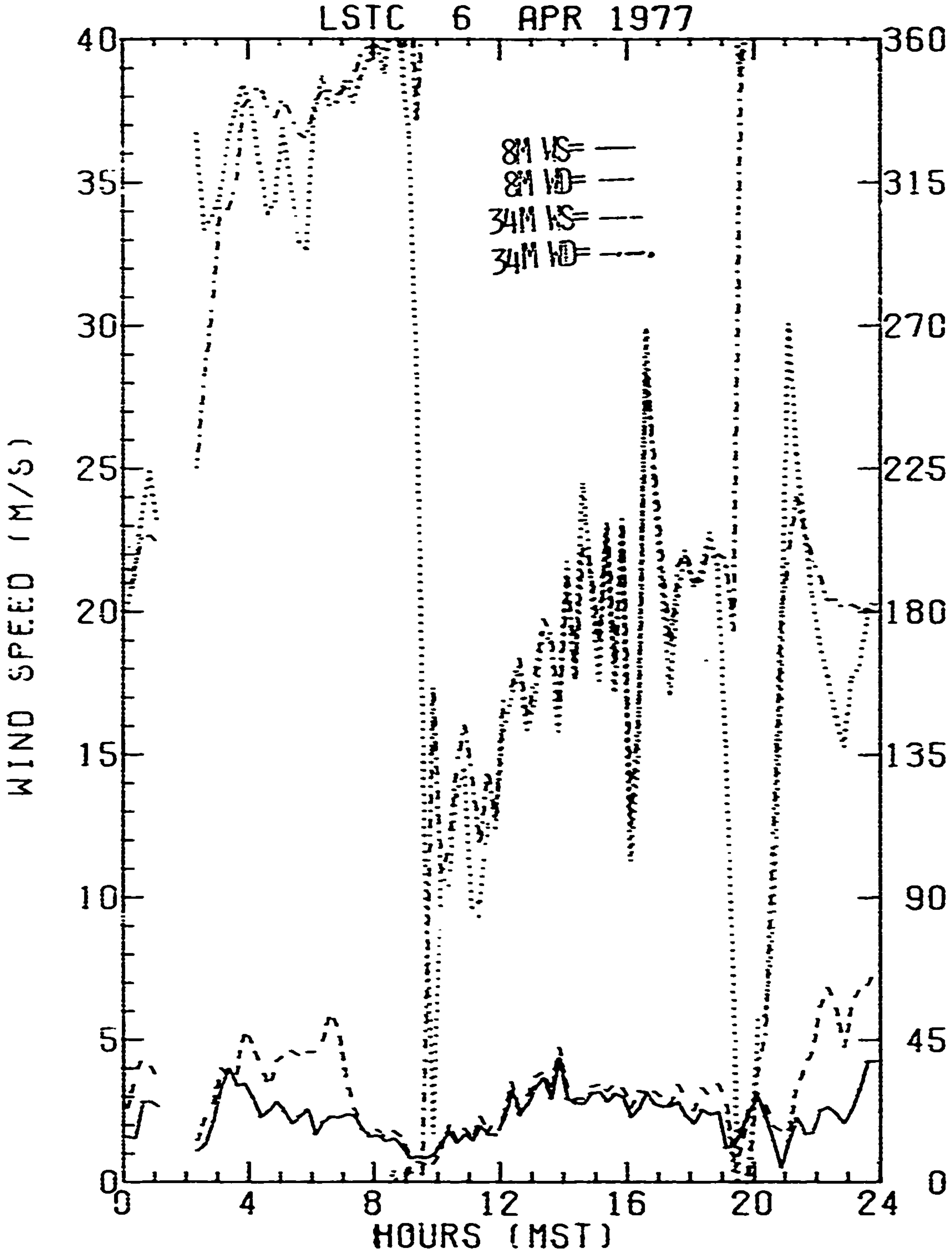


Figure 141. Diurnal variation of windspeed and wind direction at the 8 and 34 tower levels, LSTC, 6 April 1977.

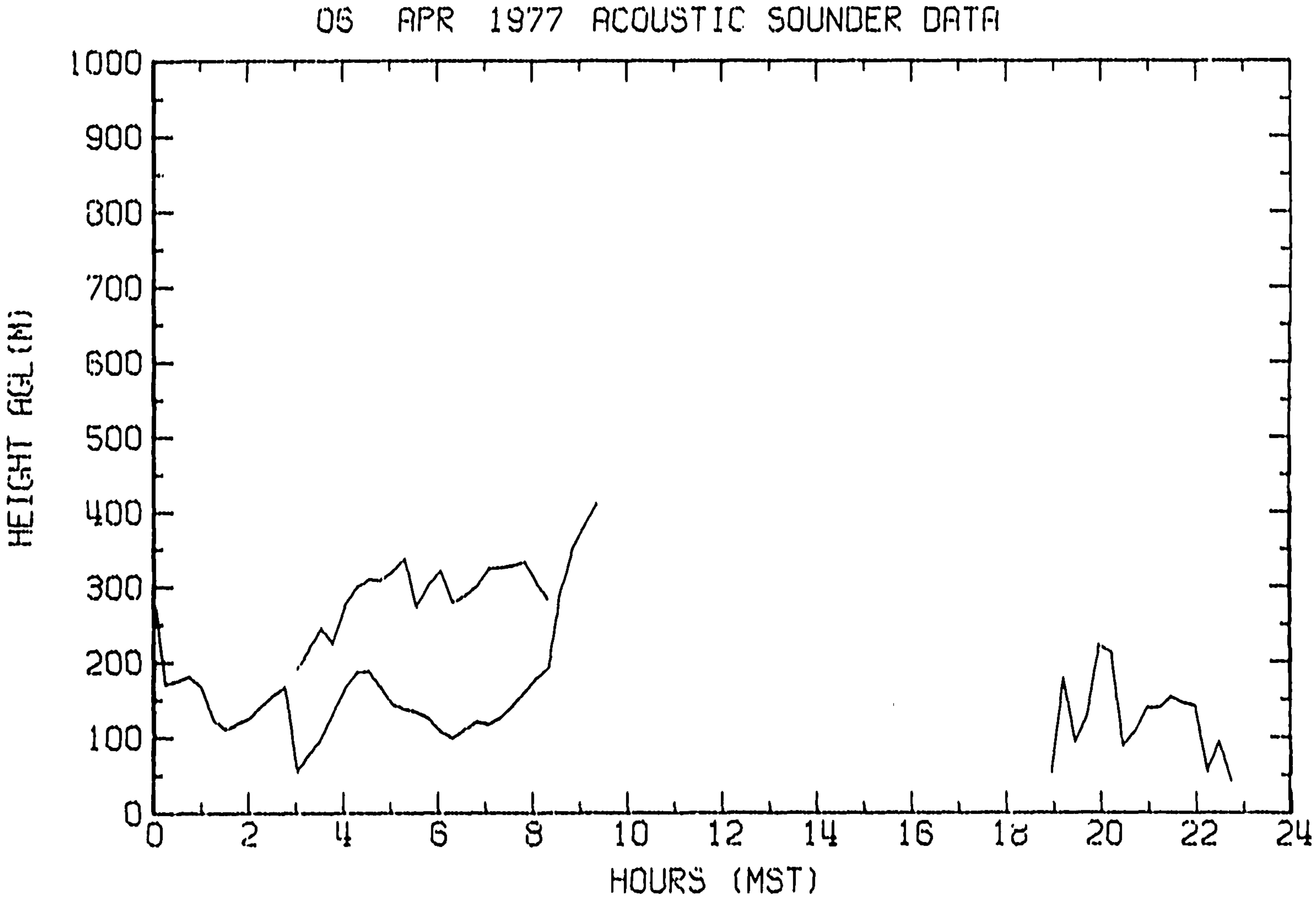


Figure 142. Inversion heights, LSTC, 6 April 1977

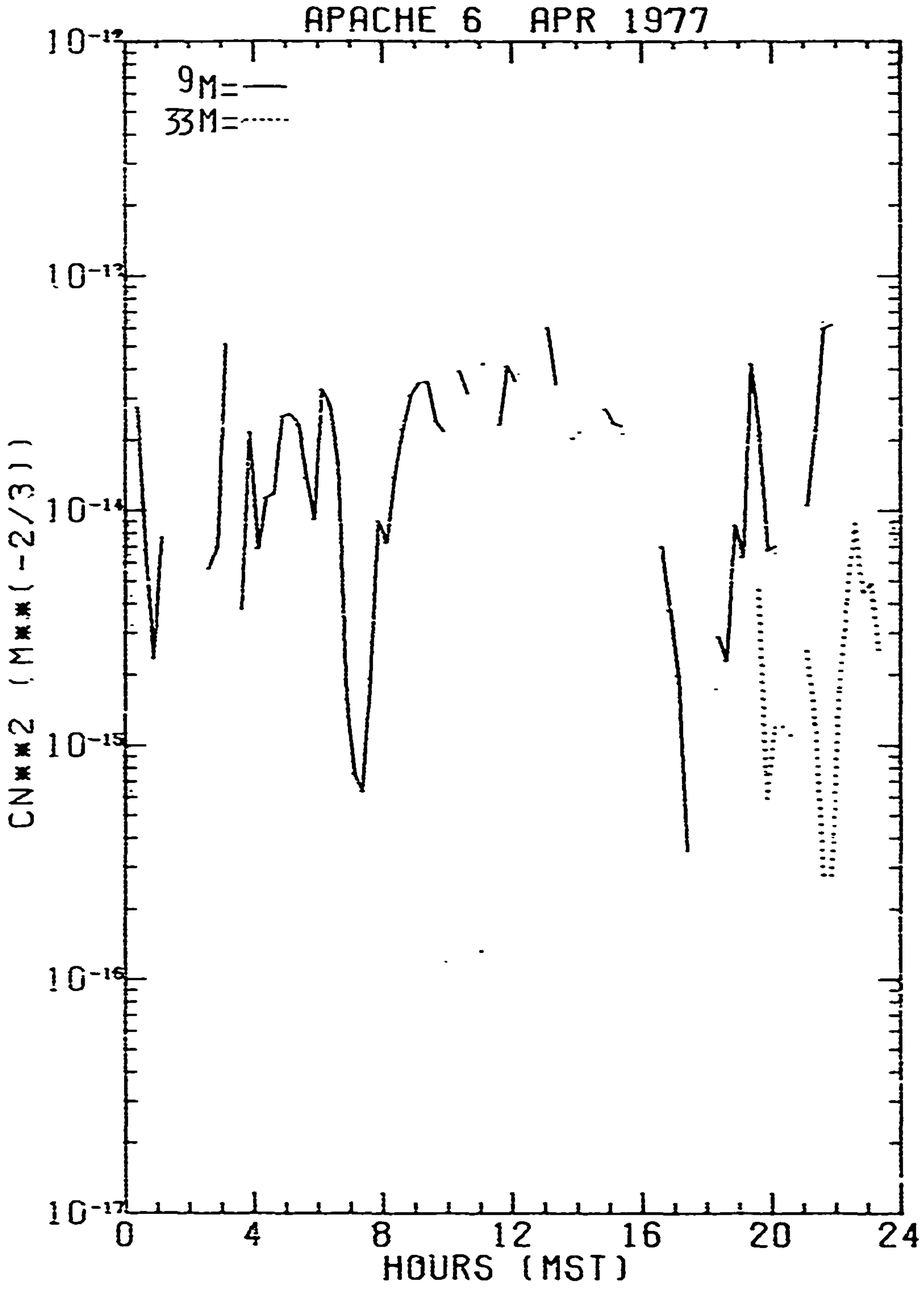


Figure 143. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 6 April 1977.

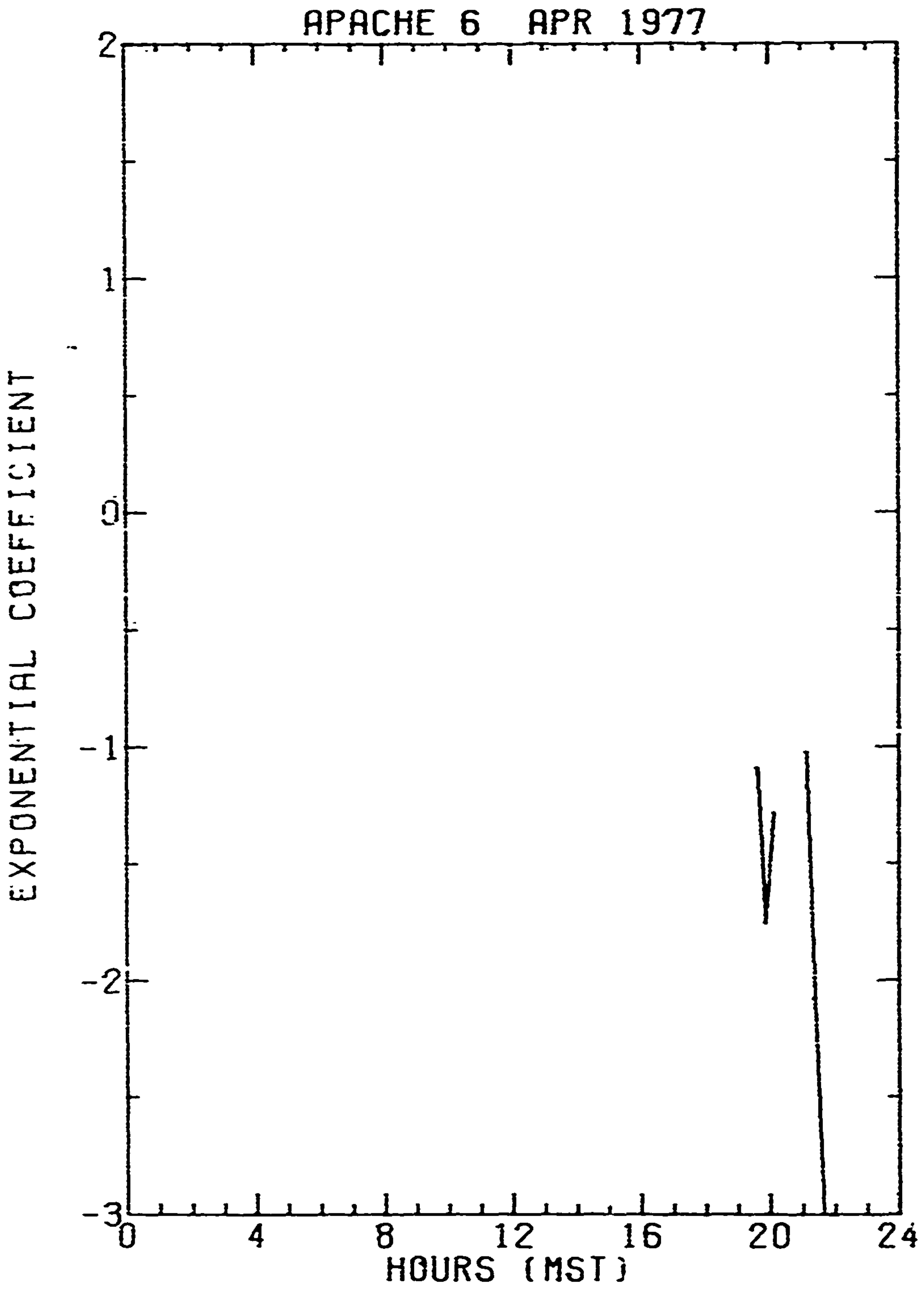


Figure 144. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 6 April 1977.

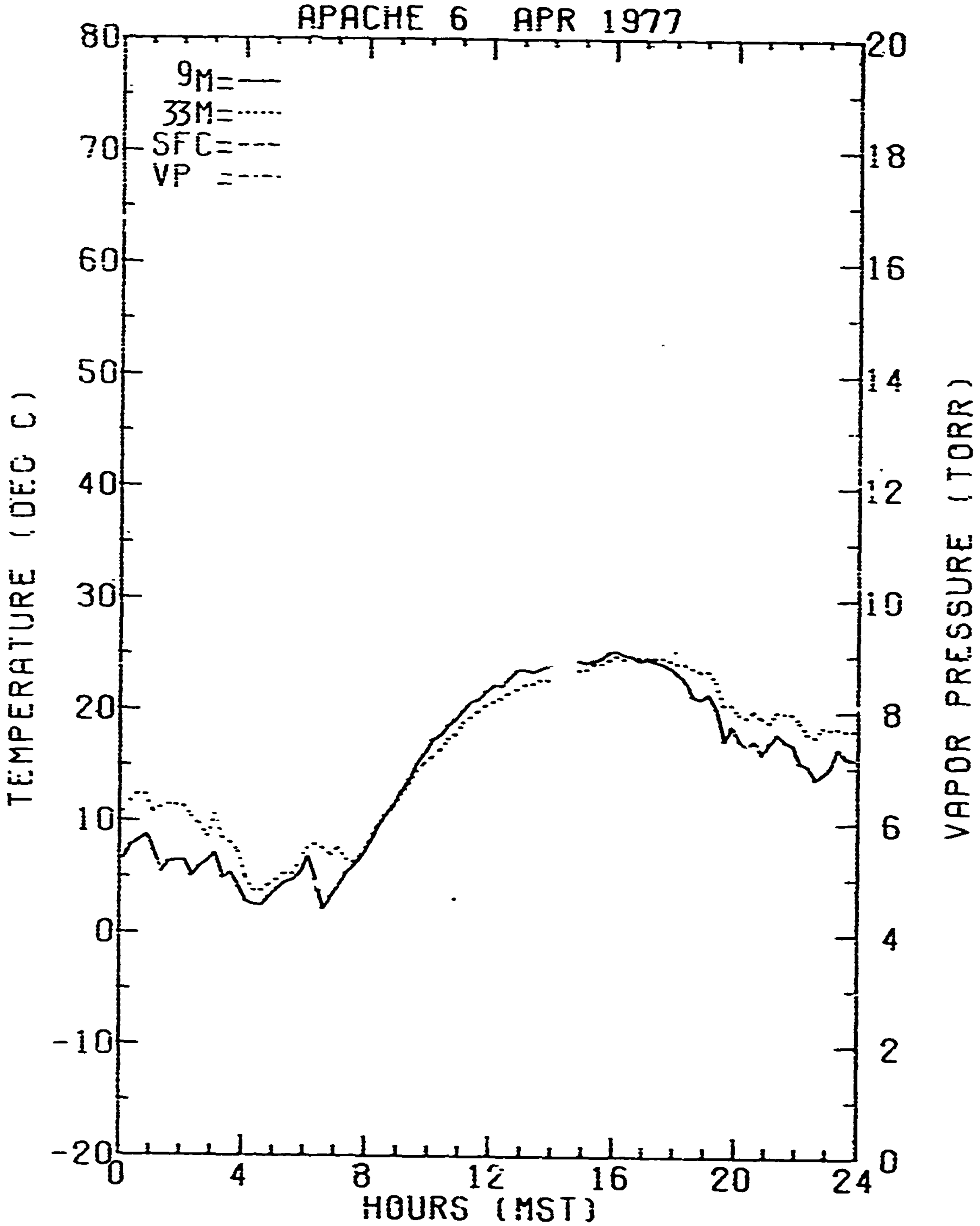


Figure 145. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 6 April 1977.

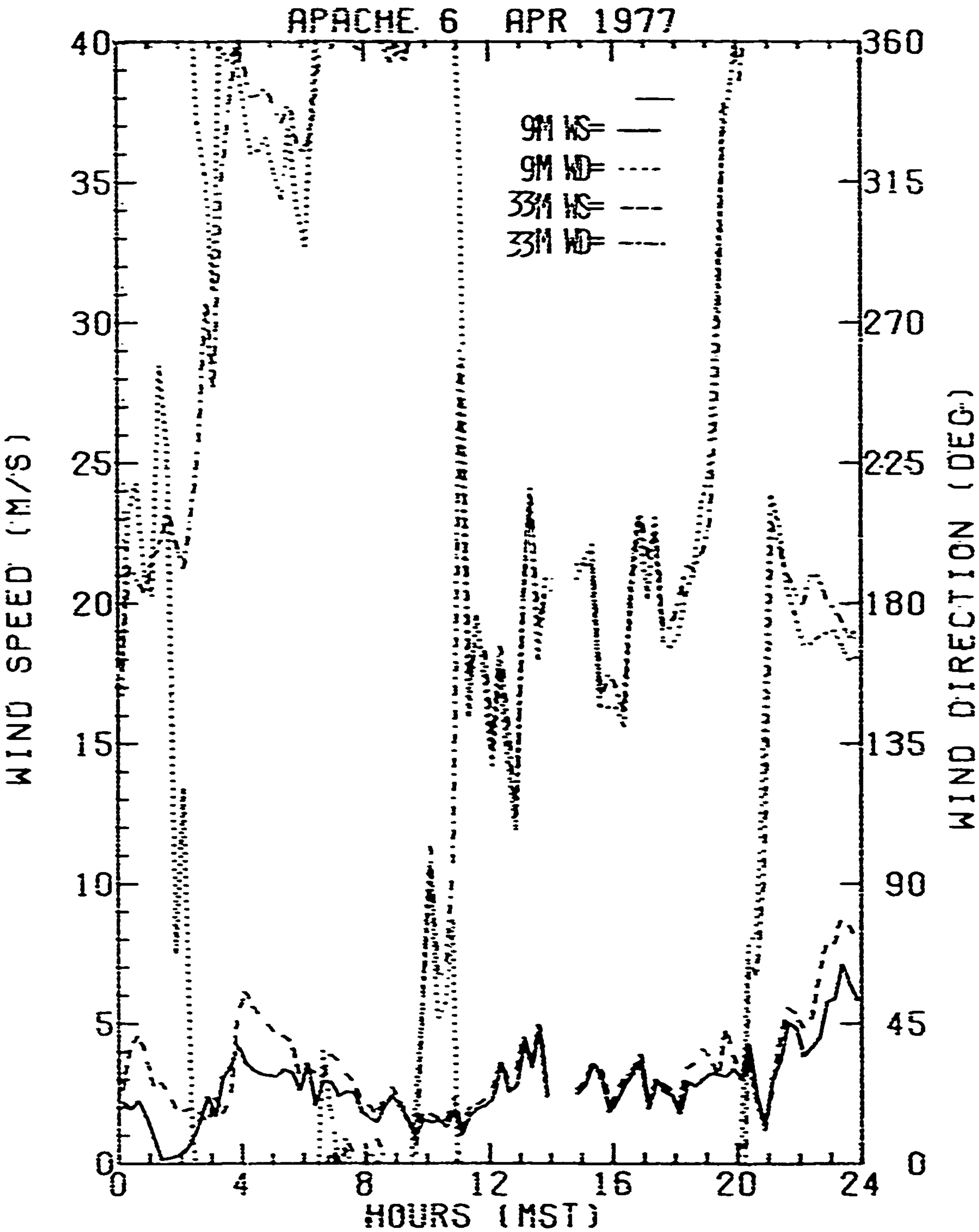


Figure 146. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 6 April 1977.

TABLE 79
APACHE SITE RAWINSONDE DATA

DATE: 06 APR 77 RELEASE NO. 46 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	665.6	1.7	2.2	310.0	1.0
36.0	661.0	5.6	2.7	305.0	0.5
182.6	651.0	10.4	3.2	170.0	0.5
357.1	637.5	10.4	3.0	149.0	1.5
731.7	609.4	10.1	2.8	145.0	3.6
1299.0	569.1	7.5	2.2	151.0	5.2
1956.2	525.0	1.1	1.8	119.0	5.2
3003.8	460.0	-7.2	1.1	250.1	4.0

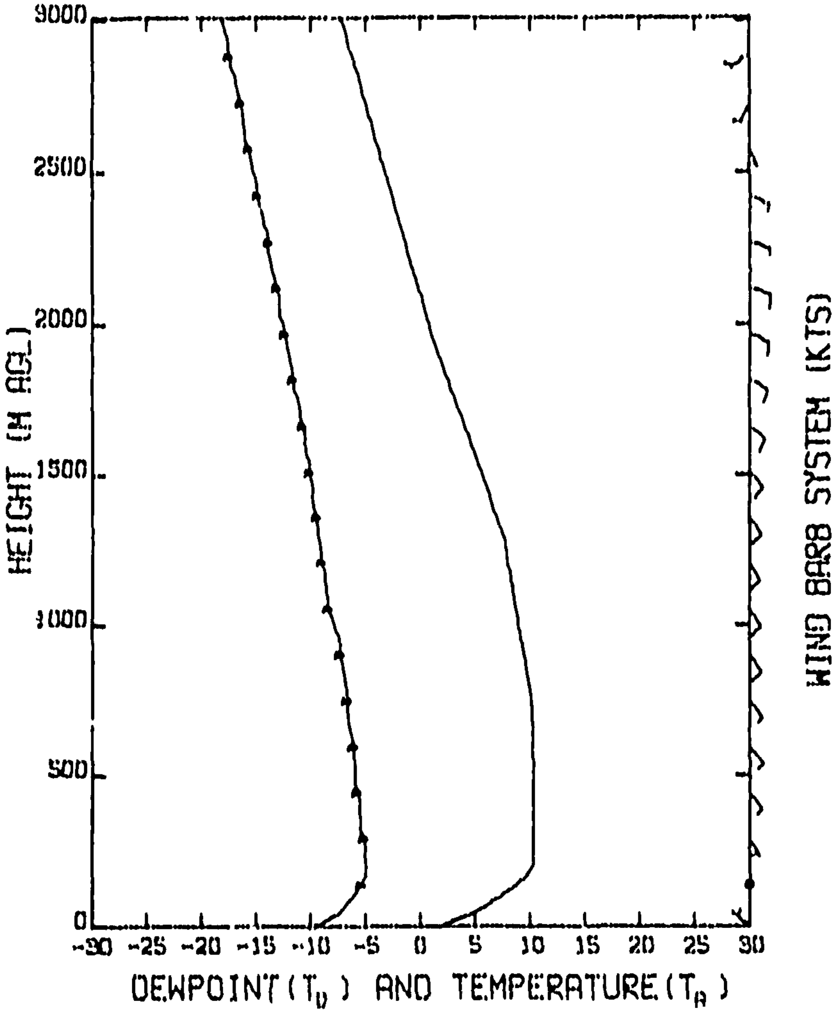


TABLE 80
APACHE SITE RAWINSONDE DATA

DATE: 06 APR 77 RELEASE NO.: 47 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	666.3	21.0	3.5	170.0	2.1
379.1	637.5	17.0	2.6	130.0	2.6
1111.7	584.2	8.8	1.7	124.0	5.7
1582.1	551.8	6.5	1.5	154.0	6.7
1988.8	525.0	2.7	1.2	179.0	6.2
3110.8	456.0	-6.5	0.5	207.2	3.6

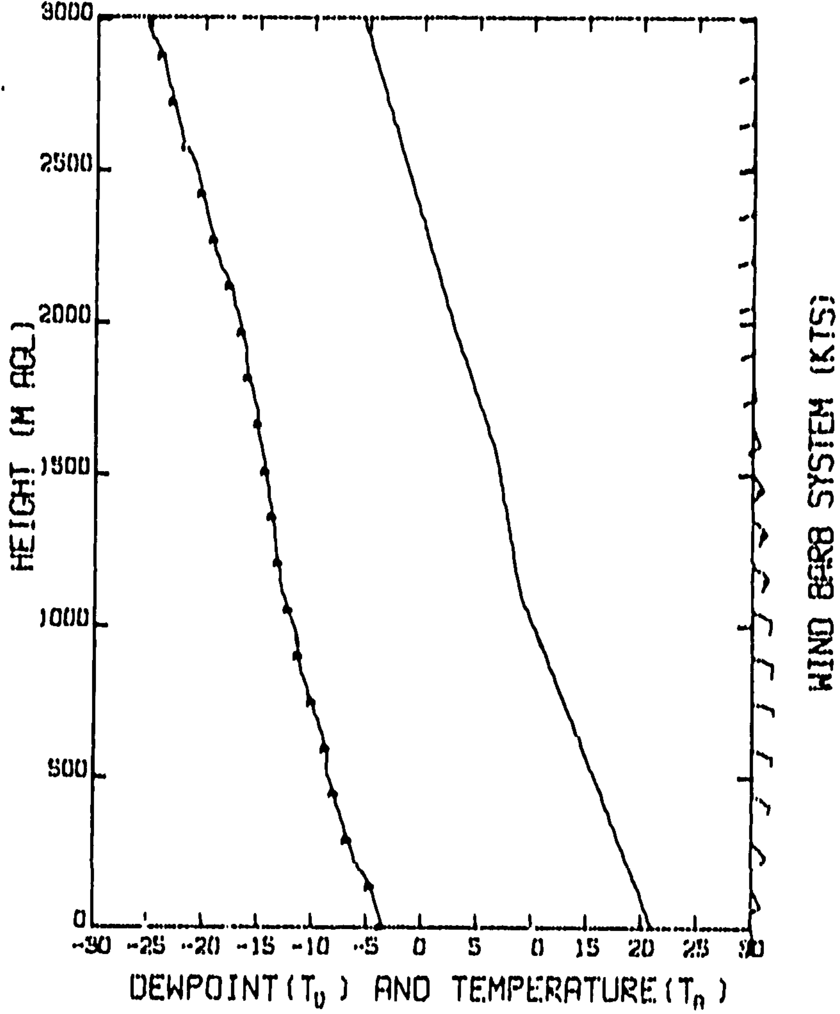


TABLE 81
APACHE SITE RAWINSONDE DATA

DATE: 06 APR 77 RELEASE NO.: 48 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	663.8	25.2	2.6	0.0	0.0
98.4	656.4	24.1	3.8	198.0	0.5
352.3	637.5	21.1	3.2	198.0	1.5
1983.4	525.0	4.8	1.4	167.0	3.6
3478.7	435.0	-9.5	0.9	252.6	6.2

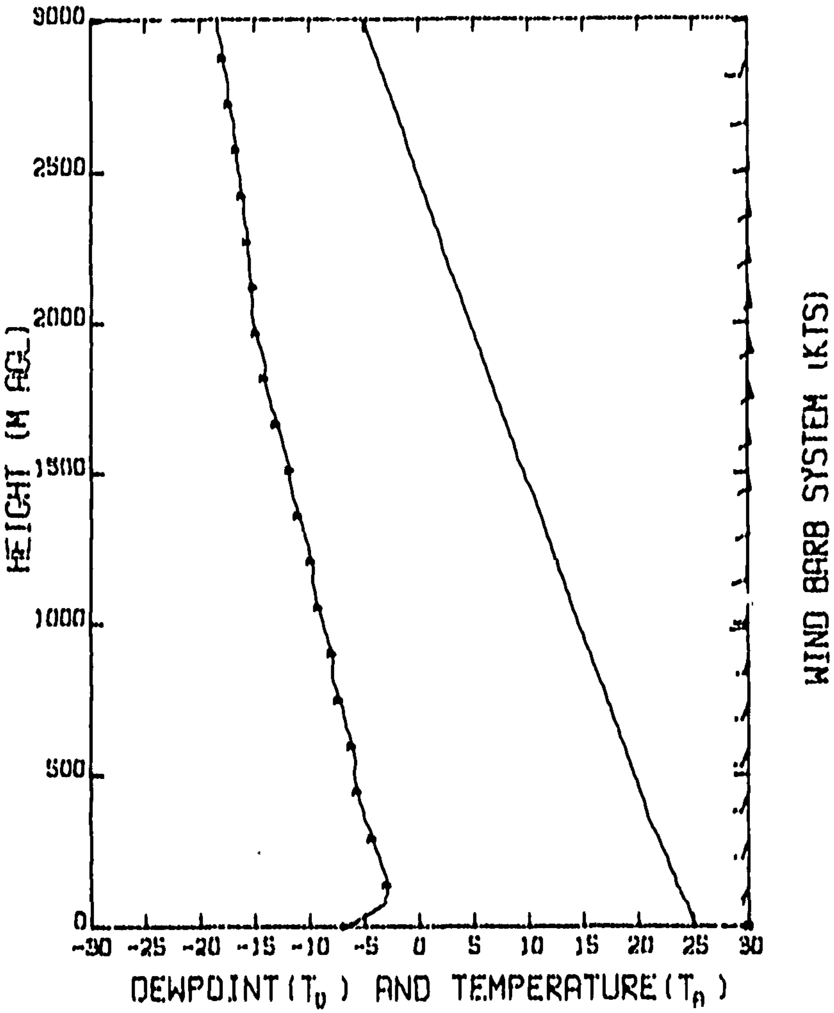
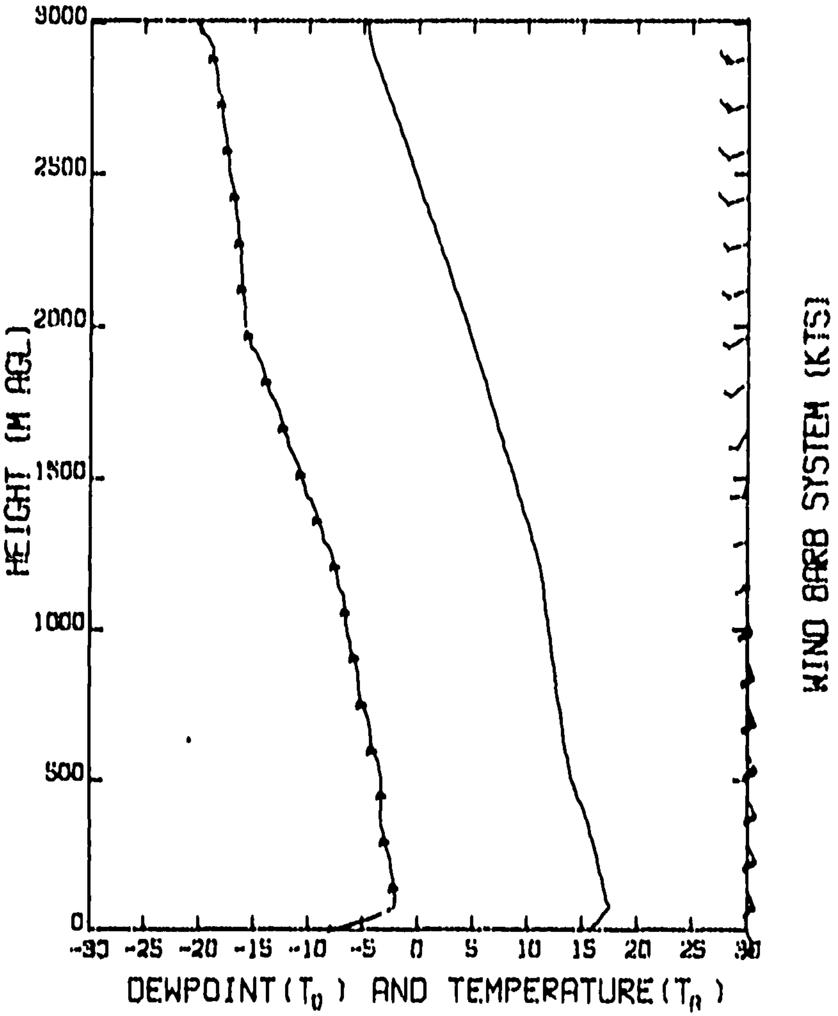


TABLE 82
APACHE SITE RAWINSONDE DATA

DATE: 06 APR 77 RELEASE NO. 49 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	665.8	15.8	2.4	160.0	6.2
70.3	660.3	17.5	4.0	159.0	7.2
369.3	637.5	15.4	3.5	158.0	10.3
499.7	627.7	14.0	3.6	157.0	11.9
631.6	618.0	13.3	3.3	157.0	12.9
1212.9	576.6	11.1	2.6	176.0	8.2
1986.6	525.0	4.6	1.3	240.0	2.6
2947.0	465.7	-4.6	1.0	261.0	9.3
3062.2	459.0	-4.5	0.8	263.3	10.8



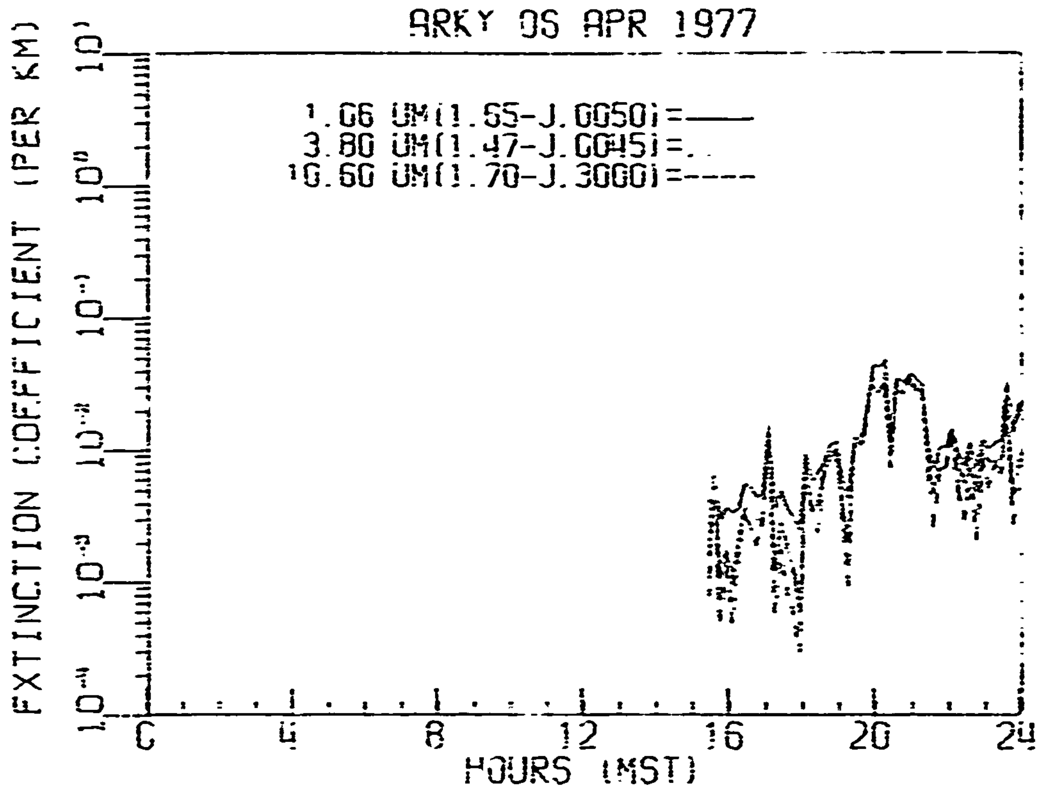


Figure 147. Diurnal variation of the particulate extinction coefficient for λ=1.06 µm, λ=3.8 µm and λ=10.6 µm for Arky Site, 6 April 1977.

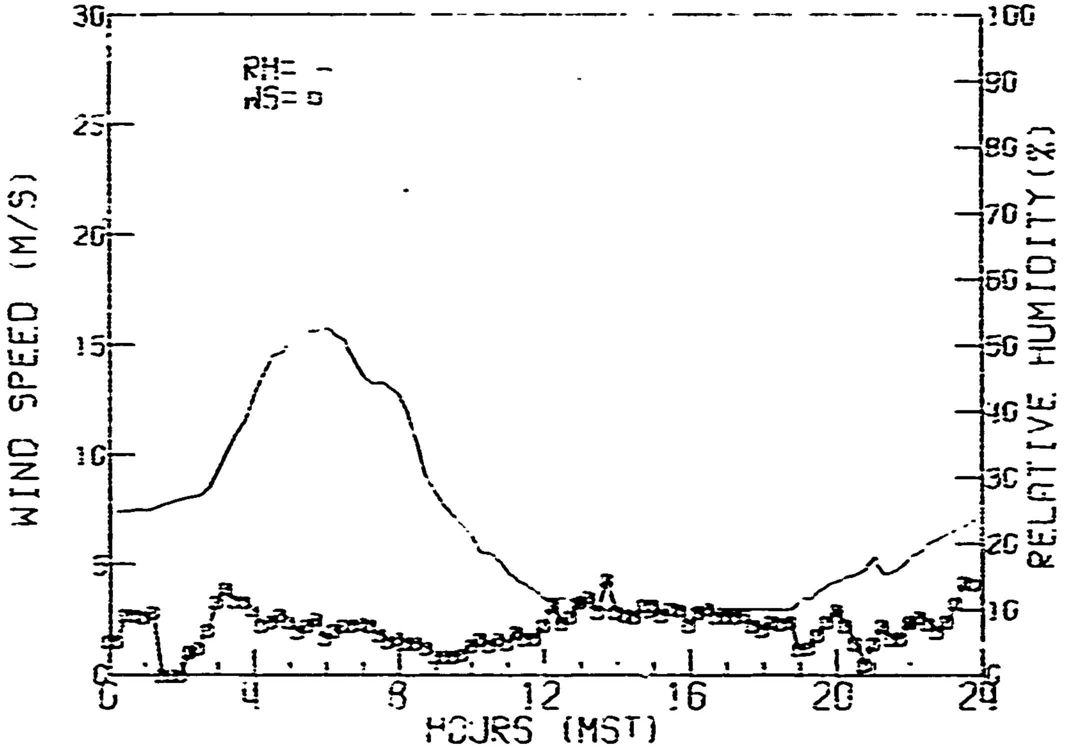


Figure 148. Diurnal variation of windspeed and relative humidity, Arky Site, 6 April 1977.

TABLE 83
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
06 APR 77													
15:25:00	600	.45+00	.21+00	.61-01	.00	.00	.00	.00	.00	.35-02	.16-02	.74-03	7.
15:35:00	600	.39+00	.19+00	.12+00	.96-01	.49-01	.00	.00	.00	.79-02	.73-02	.56-02	42.
15:45:00	600	.51+00	.15+00	.30-01	.00	.00	.00	.00	.00	.31-02	.11-02	.51-03	6.
15:55:00	600	.49+00	.11+00	.00	.15-01	.00	.00	.00	.00	.37-02	.15-02	.14-02	14.
16:05:00	600	.57+00	.21+00	.00	.00	.00	.00	.00	.00	.34-02	.99-03	.47-03	7.
16:15:00	600	.55+00	.11+00	.30-01	.15-01	.00	.00	.00	.00	.38-02	.21-02	.15-02	14.
16:25:00	600	.43+00	.24+00	.91-01	.00	.48-01	.00	.00	.00	.56-02	.36-02	.34-02	17.
16:35:00	600	.50+00	.17+00	.61-01	.30-01	.00	.00	.00	.00	.53-02	.39-02	.28-02	24.
16:45:00	600	.39+00	.24+00	.91-01	.15-01	.00	.00	.00	.00	.44-02	.32-02	.19-02	16.
16:55:00	600	.55+00	.17+00	.30-01	.00	.49-01	.00	.00	.00	.51-02	.27-02	.31-02	16.
17:05:00	600	.49+00	.17+00	.61-01	.30-01	.48-01	.39-01	.00	.00	.15-01	.15-01	.16-01	194.
17:15:00	600	.63+00	.19+00	.30-01	.00	.00	.00	.00	.00	.37-02	.13-02	.60-03	7.
17:25:00	600	.60+00	.24+00	.61-01	.15-01	.00	.00	.00	.00	.50-02	.29-02	.18-02	17.
17:35:00	600	.49+00	.19+00	.91-01	.00	.00	.00	.00	.00	.37-02	.19-02	.86-03	9.
17:45:00	600	.49+00	.13+00	.61-01	.00	.00	.00	.00	.00	.31-02	.13-02	.62-03	6.
17:55:00	600	.53+00	.11+00	.00	.00	.00	.00	.00	.00	.25-02	.55-03	.30-03	5.
18:05:00	600	.59+00	.17+00	.15+00	.15-01	.00	.20-01	.00	.00	.96-02	.83-02	.74-02	98.
18:15:00	600	.64+00	.17+00	.91-01	.00	.49-01	.00	.00	.00	.53-02	.31-02	.34-02	19.
18:25:00	600	.78+00	.34+00	.12+00	.15-01	.00	.00	.00	.00	.68-02	.41-02	.23-02	21.
18:35:00	600	.45+00	.19+00	.12+00	.00	.00	.23-01	.00	.00	.92-02	.57-02	.62-02	59.
18:45:00	600	.58+00	.28+00	.12+00	.00	.48-01	.20-01	.00	.00	.11-01	.88-02	.89-02	100.
18:55:00	600	.67+00	.26+00	.15+00	.15-01	.49-01	.23-01	.00	.00	.12-01	.13-01	.10-01	107.
19:05:00	600	.52+00	.34+00	.91-01	.00	.48-01	.00	.00	.00	.66-02	.40-02	.36-02	19.
19:15:00	600	.73+00	.11+00	.12+00	.00	.00	.00	.00	.00	.44-02	.23-02	.16-03	9.
19:25:00	600	.62+00	.26+00	.61-01	.00	.00	.39-01	.00	.00	.13-01	.11-01	.11-01	170.
19:35:00	600	.64+00	.32+00	.91-01	.00	.49-01	.23-01	.00	.00	.11-01	.85-02	.59-02	100.
19:45:00	600	.12+01	.73+00	.33+00	.61-01	.48-01	.20-01	.00	.00	.21-01	.18-01	.15-01	149.
19:55:00	600	.25+01	.15+01	.71+00	.61-01	.95-01	.59-01	.00	.00	.44-01	.35-01	.31-01	346.
20:05:00	600	.33+01	.18+01	.64+00	.46-01	.14+00	.39-01	.00	.00	.44-01	.32-01	.28-01	272.
20:15:00	600	.29+01	.21+01	.76+00	.14+00	.95-01	.59-01	.00	.00	.49-01	.43-01	.52-01	319.
20:25:00	600	.10+01	.45+00	.18+00	.46-01	.48-01	.00	.00	.00	.12-01	.92-02	.75-02	52.
20:35:00	600	.92+00	.64+00	.43+00	.11+00	.49-01	.79-01	.00	.00	.35-01	.35-01	.34-01	414.
20:45:00	600	.15+01	.11+01	.61+00	.91-01	.19+00	.20-01	.00	.00	.33-01	.29-01	.27-01	205.
20:55:00	600	.12+01	.97+00	.47+00	.11+00	.11+00	.59-01	.00	.00	.38-01	.35-01	.35-01	359.
21:05:00	600	.15+01	.11+01	.43+00	.14+00	.19+00	.20-01	.00	.00	.35-01	.31-01	.29-01	227.
21:15:00	600	.13+01	.94+00	.27+00	.11+00	.11+00	.39-01	.00	.00	.31-01	.29-01	.28-01	273.
21:25:00	600	.78+00	.43+00	.30+00	.00	.00	.20-01	.00	.00	.12-01	.99-02	.76-02	90.
21:35:00	600	.65+00	.45+00	.15+00	.15-01	.00	.00	.00	.00	.73-02	.47-02	.26-02	22.
21:45:00	600	.68+00	.43+00	.15+00	.46-01	.48-01	.00	.00	.00	.71-01	.86-02	.72-02	48.
21:55:00	600	.53+00	.47+00	.15+00	.15-01	.00	.23-01	.00	.00	.11-01	.94-02	.79-02	102.
22:05:00	600	.70+00	.41+00	.15+00	.46-01	.48-01	.20-01	.00	.00	.15-01	.13-01	.12-01	120.

TABLE 83 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
06 APR 77													
22:15:00	600	.79+00	.36+00	.24+00	.46-01	.00	.00	.00	.00	[illegible]	.78-02	.50-02	41.
22:25:00	600	.65+00	.43+00	.29+00	.15-01	.00	.00	.00	.00	.78-02	.57-02	.30-02	24.
22:35:00	600	.62+00	.47+00	.37+00	.30-01	.48-01	.00	.00	.00	.12-01	.99-02	.72-02	45.
22:45:00	600	.73+00	.43+00	.27+00	.00	.00	.00	.00	.00	.75-02	.49-02	.22-02	17.
22:55:00	600	.64+00	.19+00	.15+00	.30-01	.00	.20-01	.00	.00	.12-01	.11-01	.89-02	112.
23:05:00	600	.74+00	.98+00	.21+00	.46-01	.00	.00	.00	.00	.10-01	.83-02	.52-02	43.
23:15:00	600	.76+00	.47+00	.10+00	.15-01	.96-01	.00	.00	.00	.12-01	.84-02	.79-02	42.
23:25:00	600	.99+00	.49+00	.24+00	.30-01	.45-01	.00	.00	.00	.12-01	.89-02	.68-02	45.
23:35:00	600	.38+01	.39+00	.21+00	.15-01	.14+00	.39-01	.00	.00	.33-01	.20-01	.22-01	232.
23:45:00	600	.25+01	.49+00	.61-01	.15-01	.00	.00	.00	.00	.14-01	.45-02	.28-02	33.
23:55:00	600	.43+01	.41+00	.27+00	.30-01	.00	.00	.00	.00	.23-01	.86-02	.52-02	57.

Weather Summary

Date: 7 April 1977

Synoptic

Surface: Weak pressure gradient over New Mexico.

500 Millibar: Weak ridge over western United States with light westerly flow over New Mexico.

Holloman AFB

Clouds: Clear to thin scattered high clouds (cirrus) with patches of low clouds (cumulus) at 1800 m AGL during the afternoon.

Wind: Light and variable with peak gust of 6 m sec^{-1} from the west about midmorning.

Visibility: Greater than 60 km.

Maximum temperature:	28.3°C	Corresponding vapor pressure:	3.6 Torr
Minimum temperature:	5.6°C	Corresponding vapor pressure:	2.5 Torr

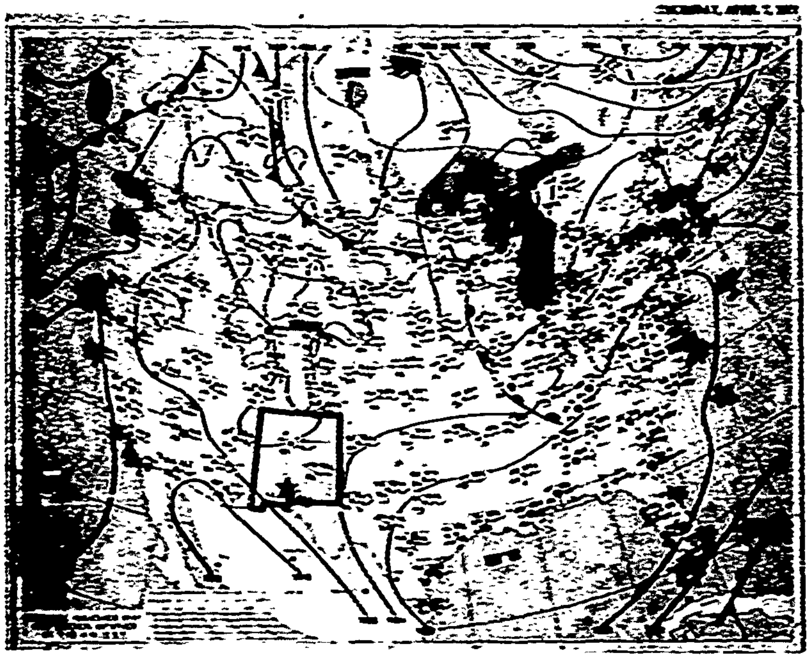


Figure 149a. Surface weather map for 7 April 1977.

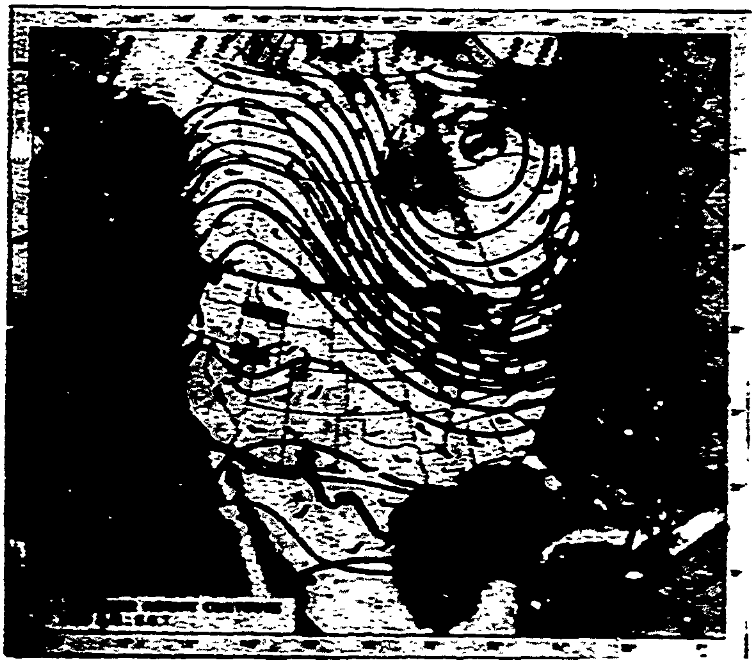


Figure 149b. 500-millibar height contours for 7 April 1977.

TABLE 84. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Mid %/Type	High %/Type	Date: 7 April 1977 Remarks
0100	11.1	2.8	-6.6	0	0	0	
0200	10.0	2.9	-6.0	0	0	0	
0300	7.8	3.0	-5.8	0	0	0	
0400	4.5	2.5	-7.9	0	0	0	
0500	2.7	2.4	-8.3	0	0	0	
0600	1.8	2.1	-10.1	0	0	20 Ci	
0700	7.2	2.8	-6.8	0	0	10 Ci	Checked Apache - all ok
0800	11.7	3.0	-5.5	0	0	10 Ci	
0900	16.7	3.4	-4.0	0	0	10 Ci	
1000	20.1	4.0	-1.6	0	0	10 Ci	
1100	21.5	3.6	-3.4	0	0	10 Ci	Few Cu ENE of station
1200	23.7	3.6	-3.1	10 Cu	0	10 Ci	
1300	26.3	3.4	-4.2	10 Cu	0	10 Ci	Checked Apache - all ok
1400	26.6	3.0	-5.6	10 Cu	0	20 Ci	
1500	27.2	2.7	-6.9	10 Cu	0	10 Ci	Ci is ⊙ opaque 32 m ΔT at Apache back on line 2 loose probes
1600	27.1	2.8	-6.9	10 Cu	0	0	
1700	26.8	2.8	-6.8	10 Cu	0	0	
1800							Missed reading working on 32 m ΔT
1900	23.3	3.2	-4.9	10 Cu	0	0	32 m ΔT out of commission suspect bad coax at ΔT box
2000	17.8	2.3	-8.9	0	0	0	Few Cu S of station
2100	15.6	2.4	-8.6	0	0	0	
2200	12.7	2.2	-9.9	0	0	0	Checked Apache site - no data on 32 m ΔT, wrong button pressed
2300	12.2	2.3	-9.1	0	0	0	
2400	11.3	2.3	-9.3	0	0	0	

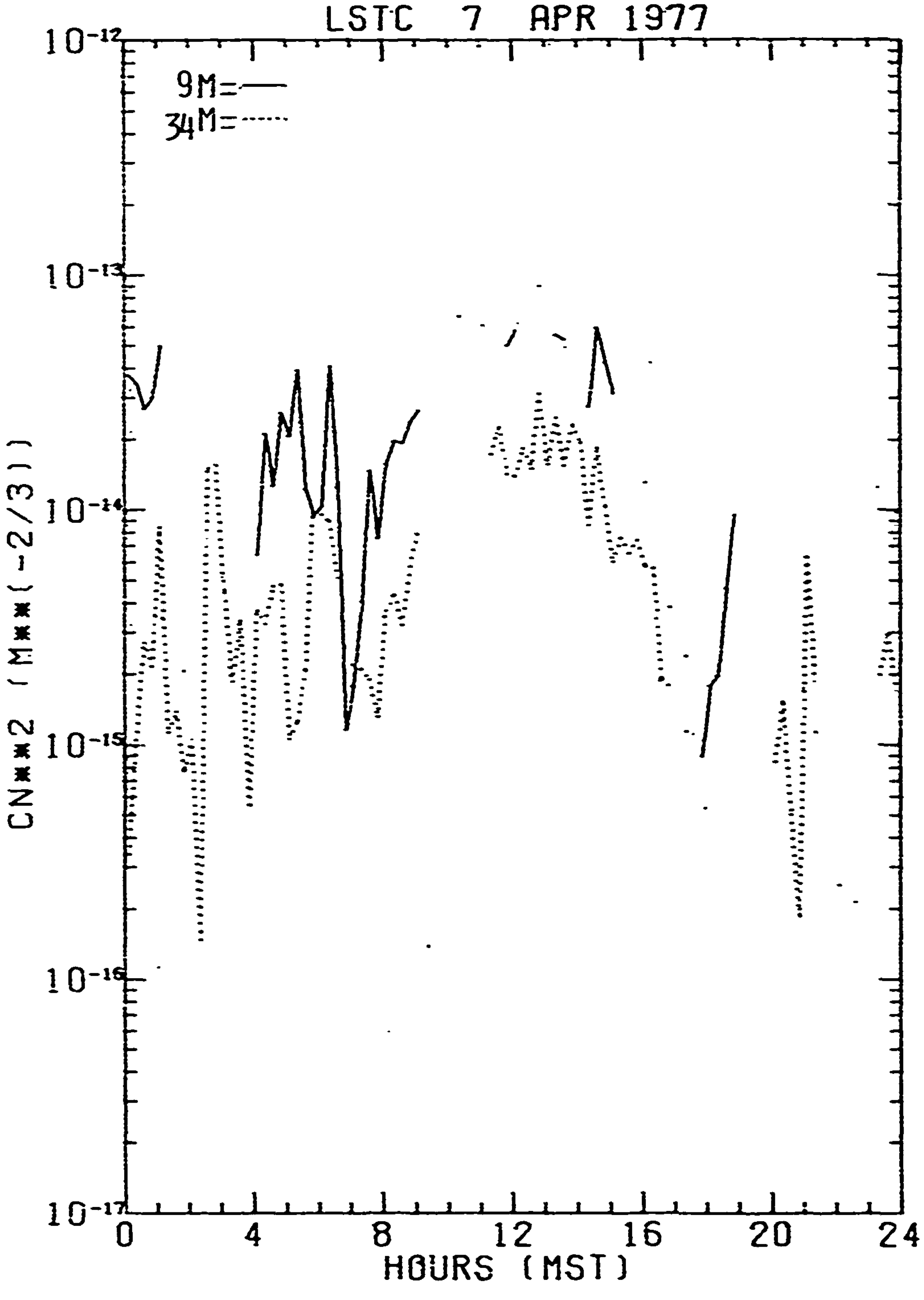


Figure 150. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 7 April 1977.

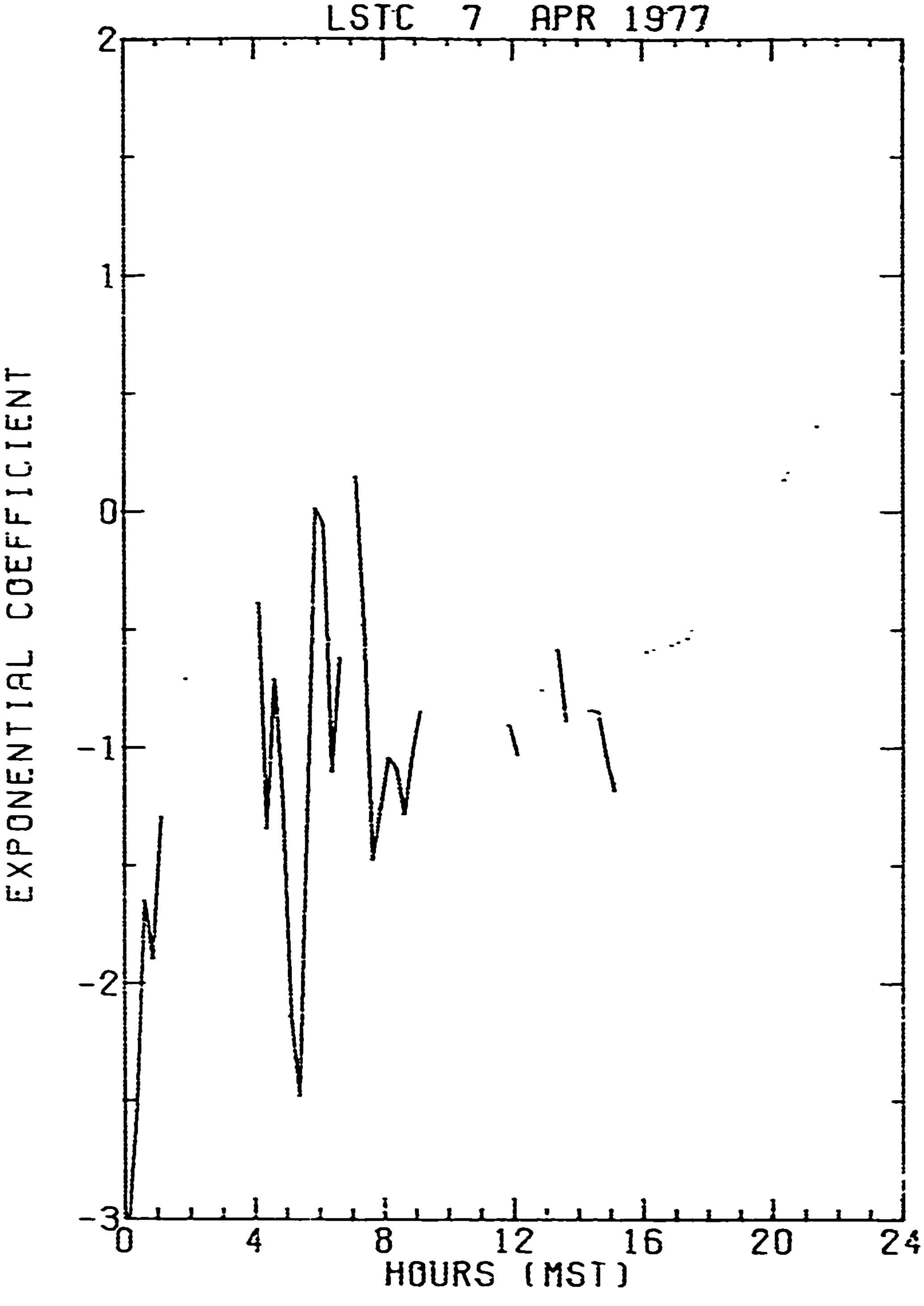


Figure 151. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the latitude and k is the 1 m C_N^2 value, LSTC, 7 April 1977.

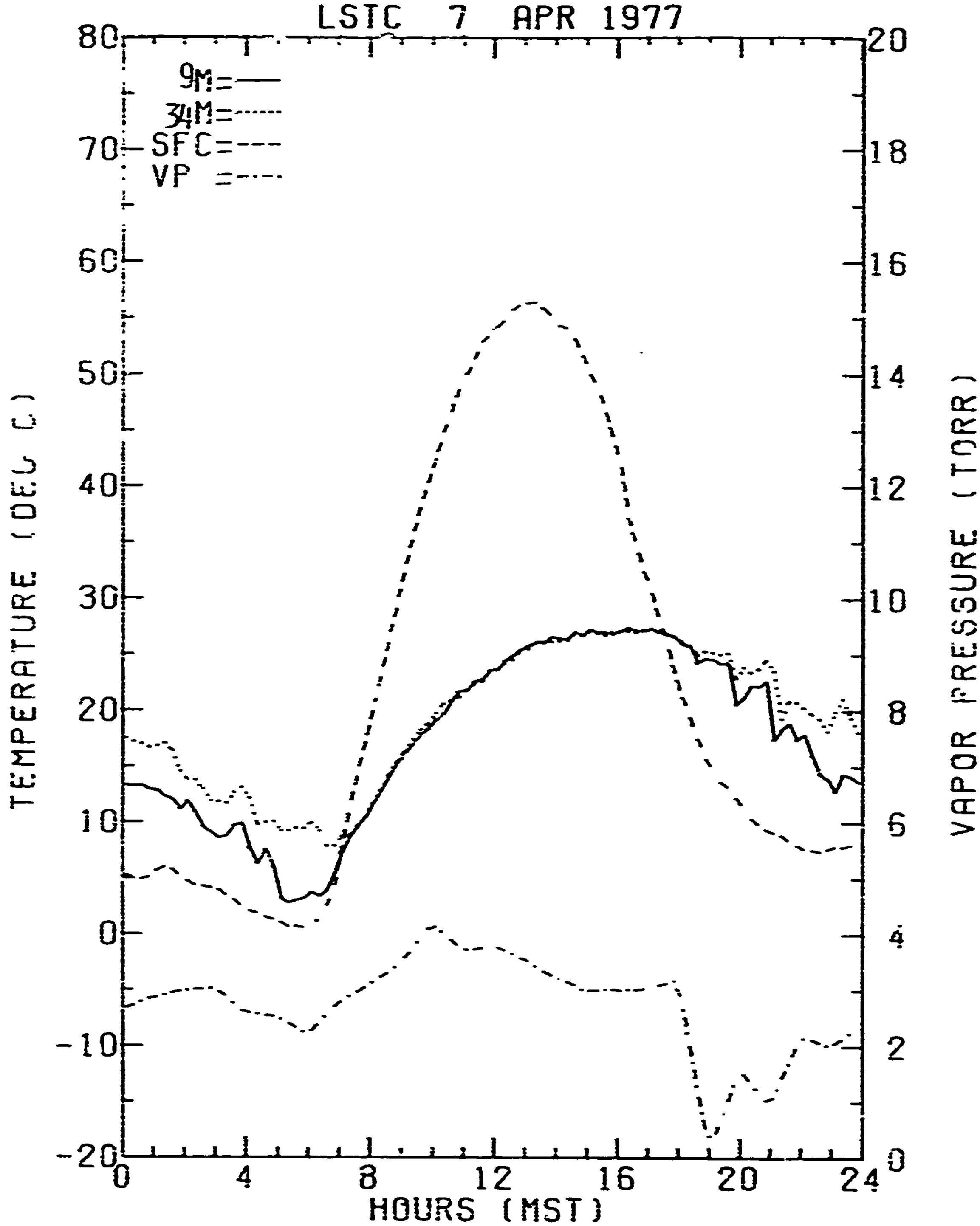


Figure 152. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 7 April 1977.

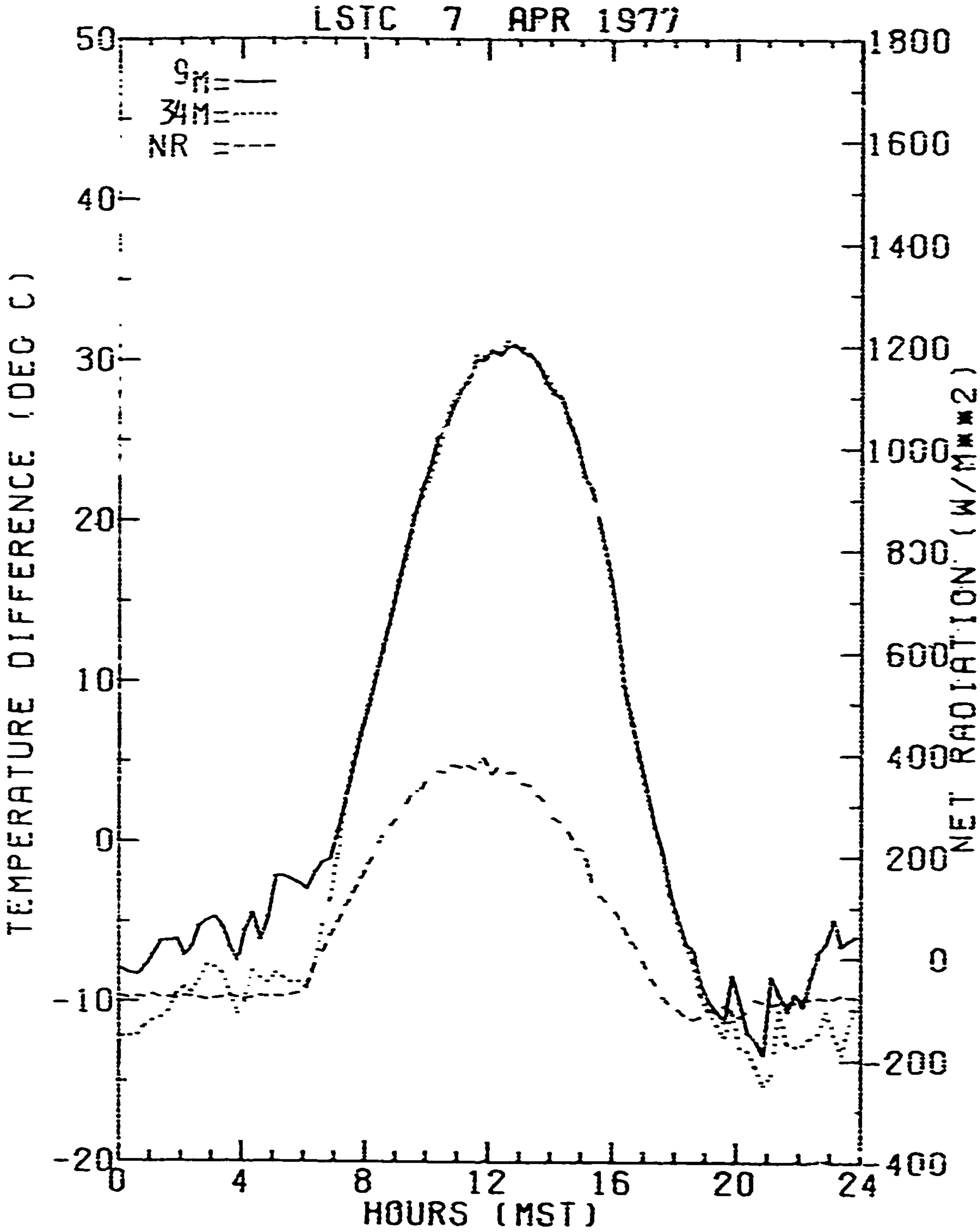


Figure 153. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 7 April 1977.

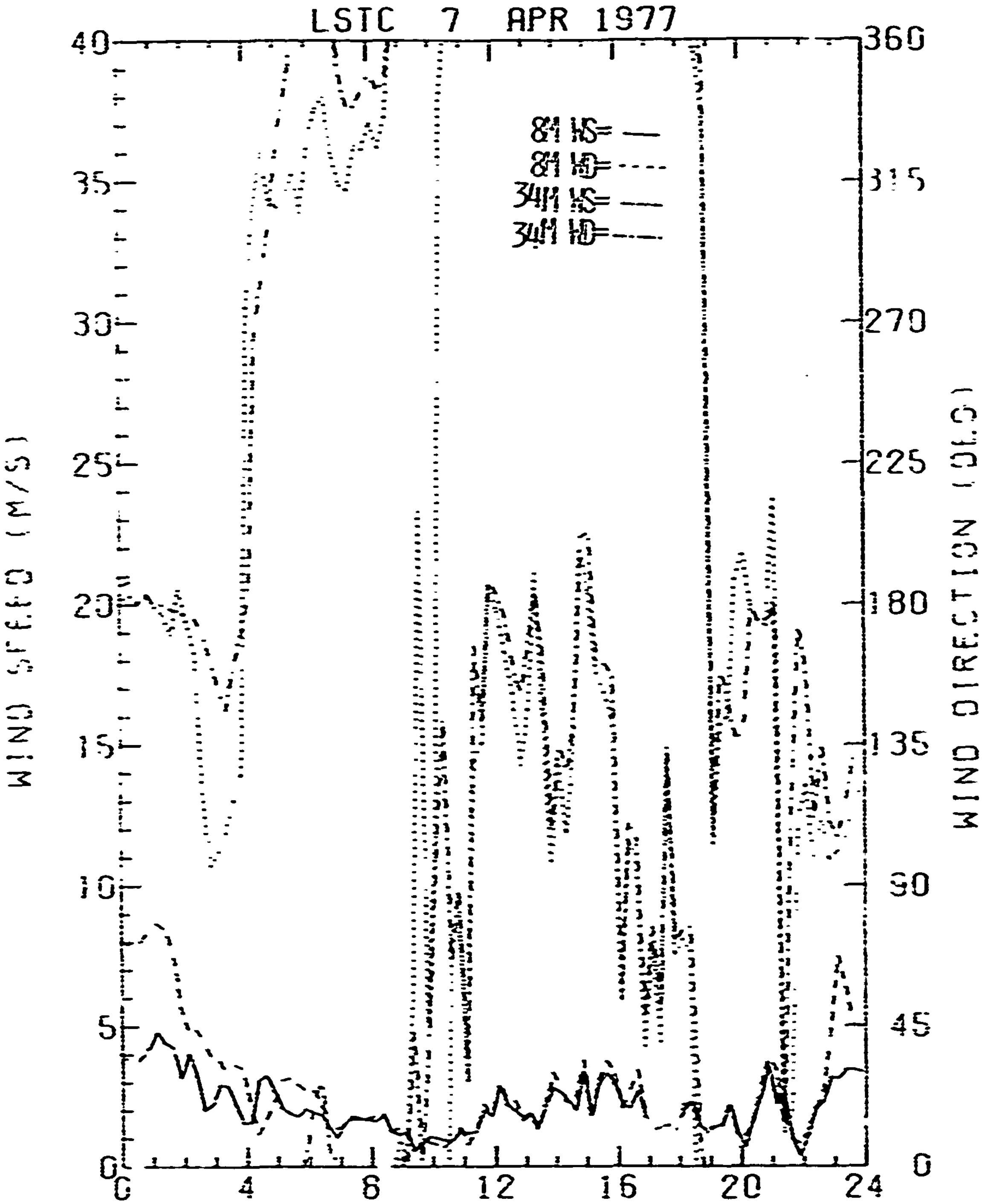


Figure 154. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 7 April 1977.

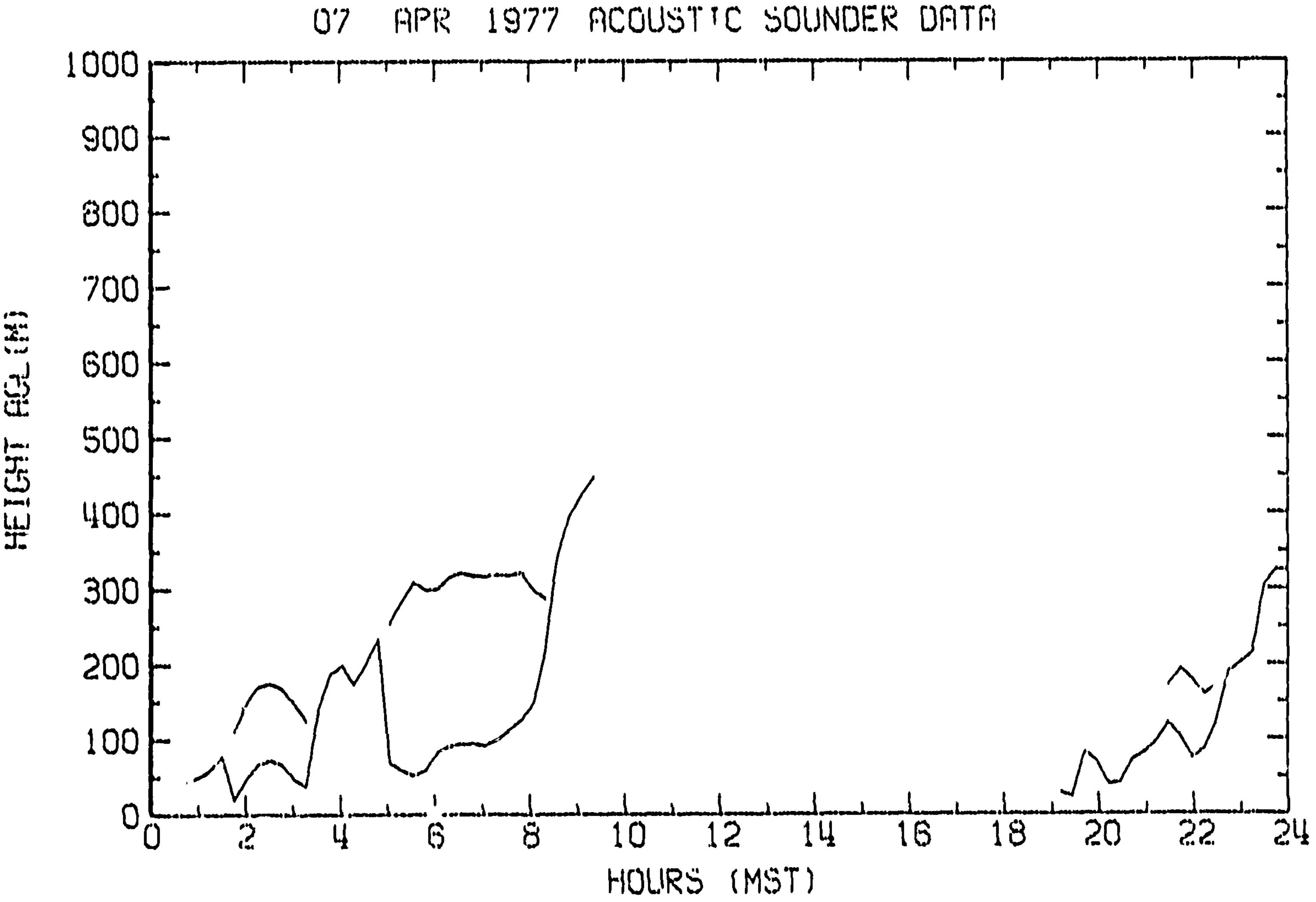


Figure 155. Inversion heights, LSTC, 7 April 1977.

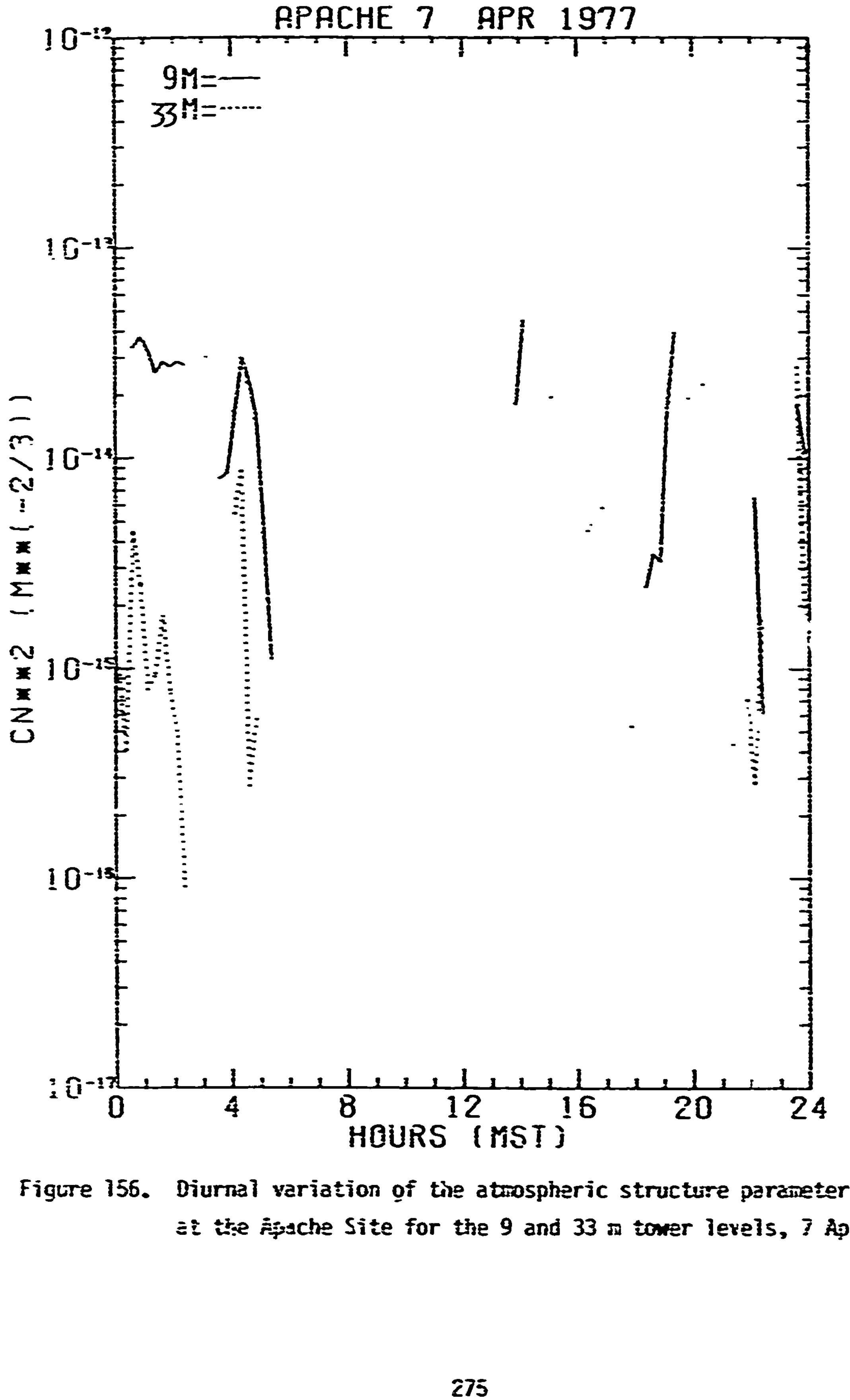


Figure 156. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 7 April 1977.

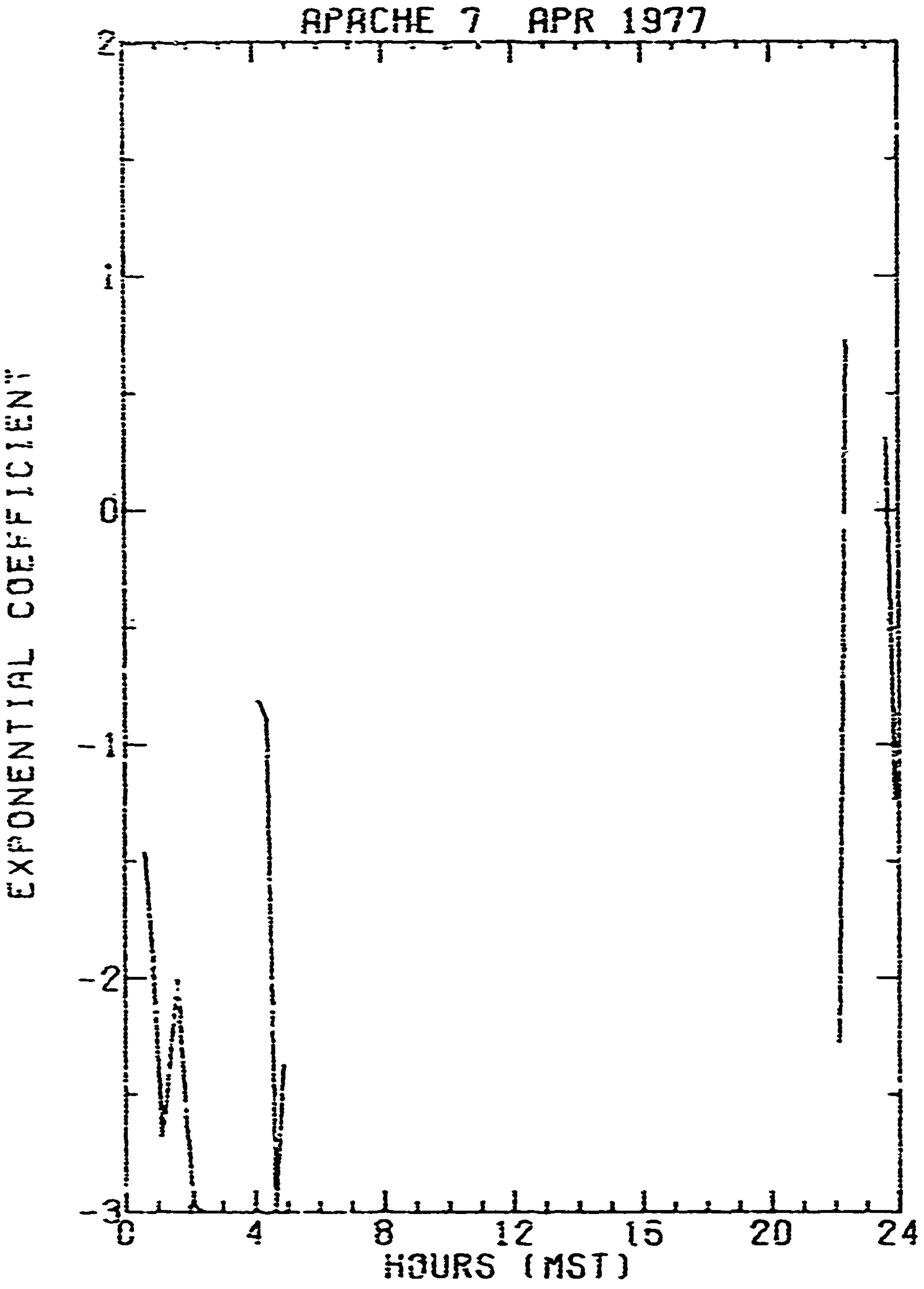


Figure 157. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 7 April 1977.

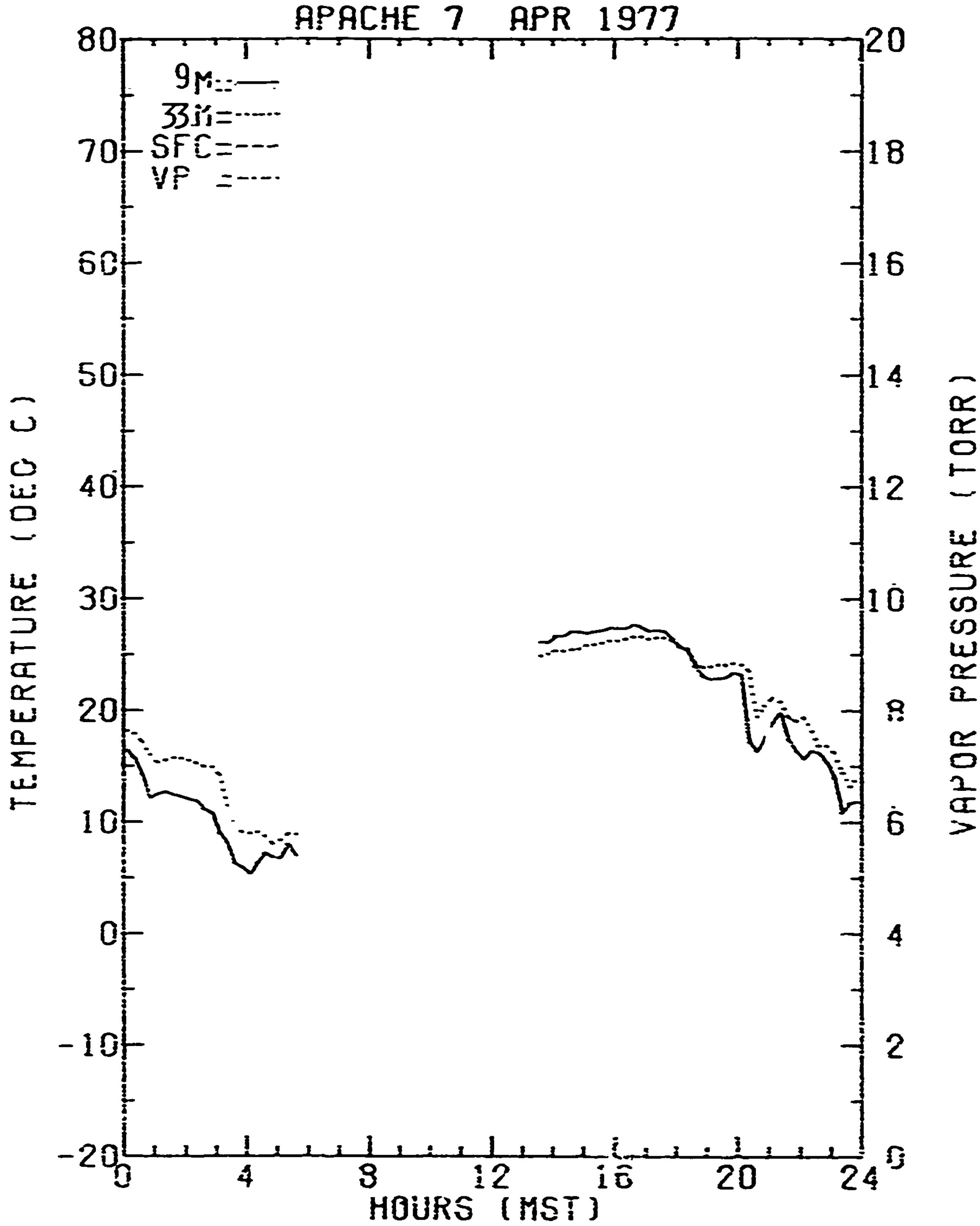


Figure 158. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 7 April 1977.

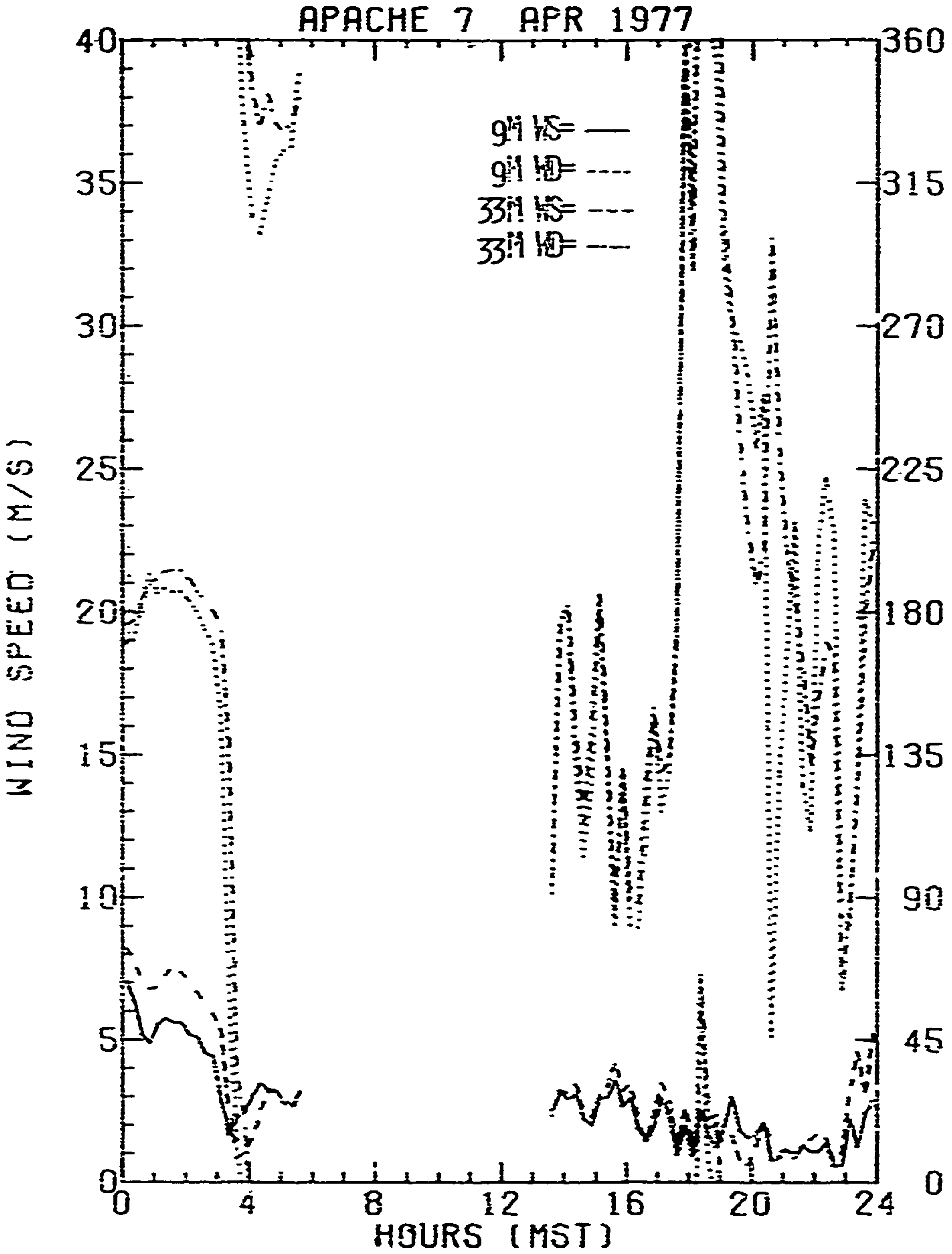


Figure 159. Diurnal variation of windspeed and wind direction at the 9 and 33 m tower levels, Apache Site, 7 April 1977.

TABLE 85
APACHE SITE RAWINSONDE DATA

DATE: 07 APR 77 RELEASE NO. 50 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	656.4	5.2	2.5	300.0	2.1
85.3	659.5	12.5	4.4	271.0	1.0
371.2	637.5	13.4	4.5	162.0	4.1
1310.3	569.8	9.9	3.2	168.0	5.2
1984.9	525.0	3.9	2.2	223.0	3.1
3102.0	456.4	-6.6	1.1	287.5	9.2

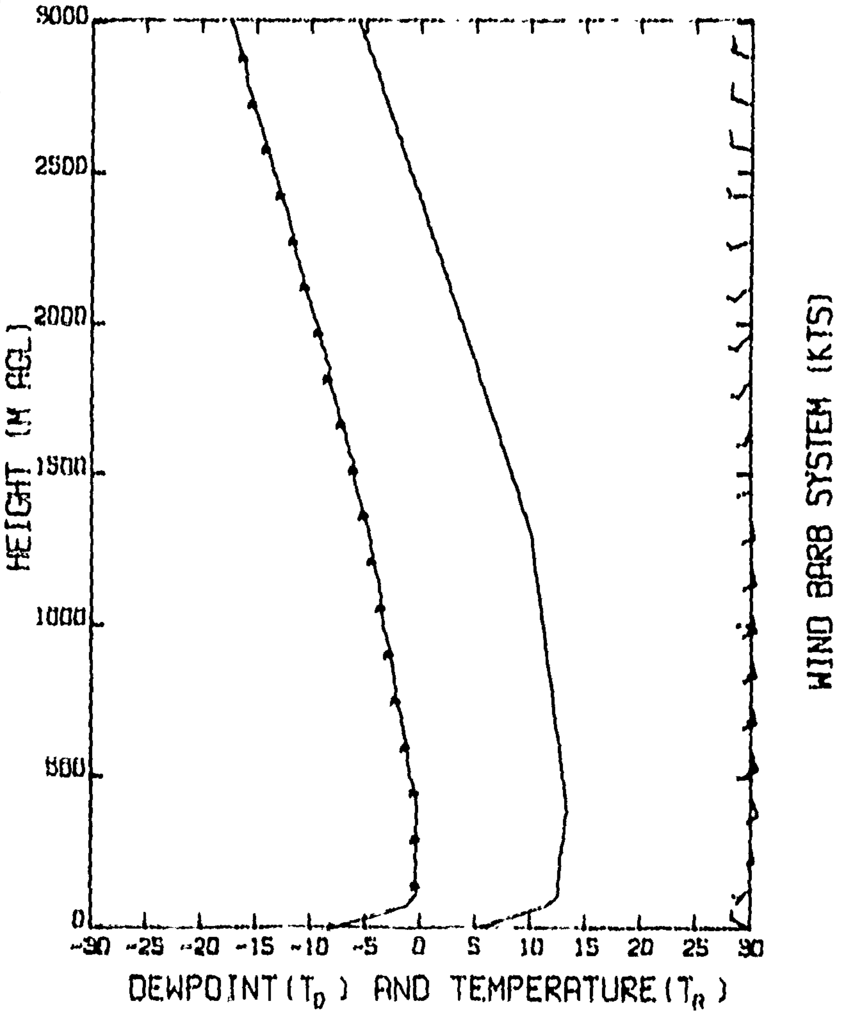


TABLE 86
APACHE SITE RAWINSONDE DATA

DATE: 07 APR 77 RELEASE NO.: 51 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	666.1	24.2	4.3	0.0	0.0
381.2	637.5	19.6	3.6	151.0	1.5
1150.3	582.3	12.3	2.2	167.0	3.6
1404.1	564.9	11.3	1.8	163.0	4.1
2009.3	525.0	5.1	1.3	157.0	2.6
4083.8	404.1	-11.4	0.3	273.5	7.4

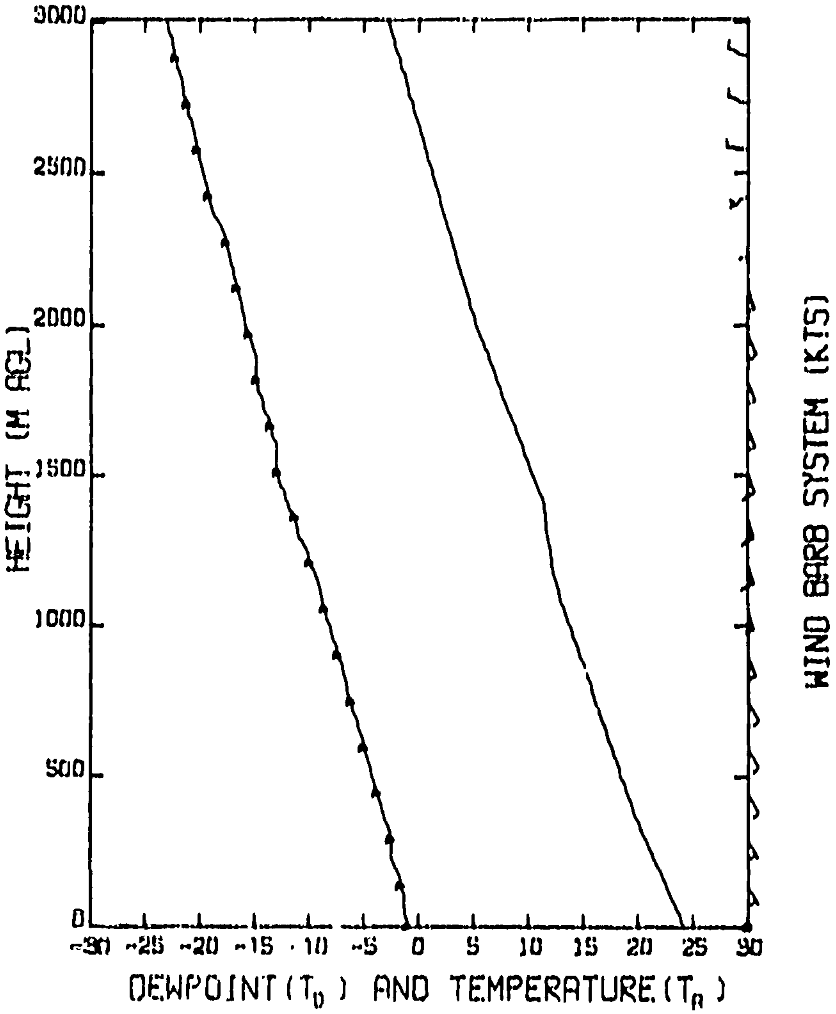


TABLE 87
APACHE SITE RAWINSONDE DATA

DATE: 07 APR 77 RELEASE NO. 52 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	663.5	28.0	4.0	0.0	0.0
351.4	637.5	23.4	3.9	162.0	1.0
1994.7	525.0	6.6	1.7	282.0	4.6
3241.9	449.5	-5.5	1.1	0.0	0.0
3818.0	417.4	-11.3	0.9	244.1	7.6

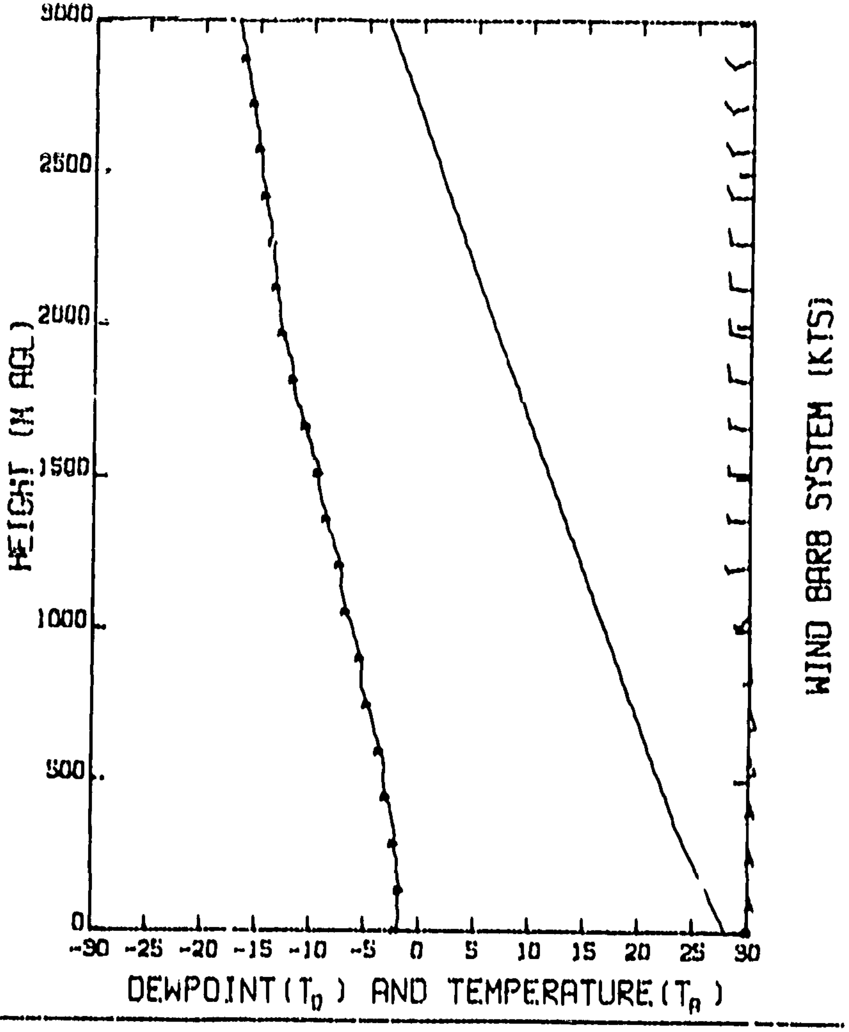
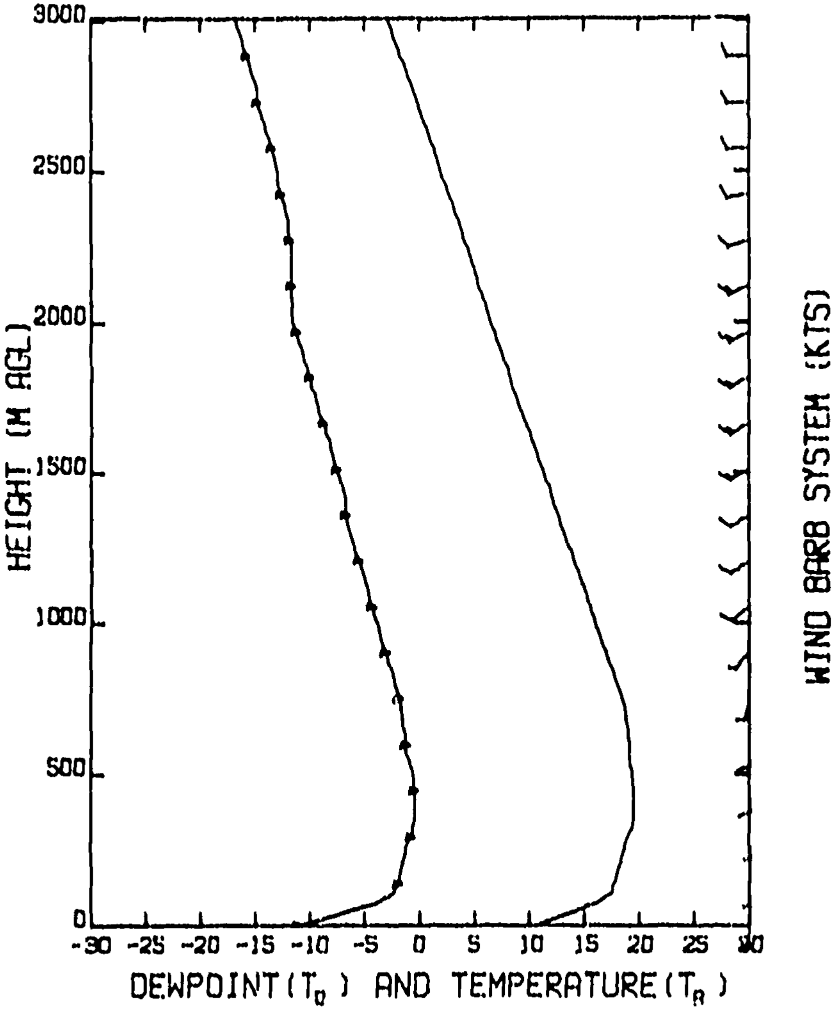


TABLE 88
APACHE SITE RAWINSONDE DATA

DATE: 07 APR 77 RELEASE NO.: 53 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	664.7	10.6	1.9	180.0	2.1
92.8	657.4	17.4	3.9	178.0	2.6
357.0	637.5	19.7	4.5	175.0	3.6
722.6	610.9	18.7	4.0	189.0	3.6
1995.5	525.0	6.5	1.9	241.0	7.2
2343.7	503.1	3.5	1.8	254.0	5.7
3677.9	425.2	-9.4	0.8	260.6	3.0



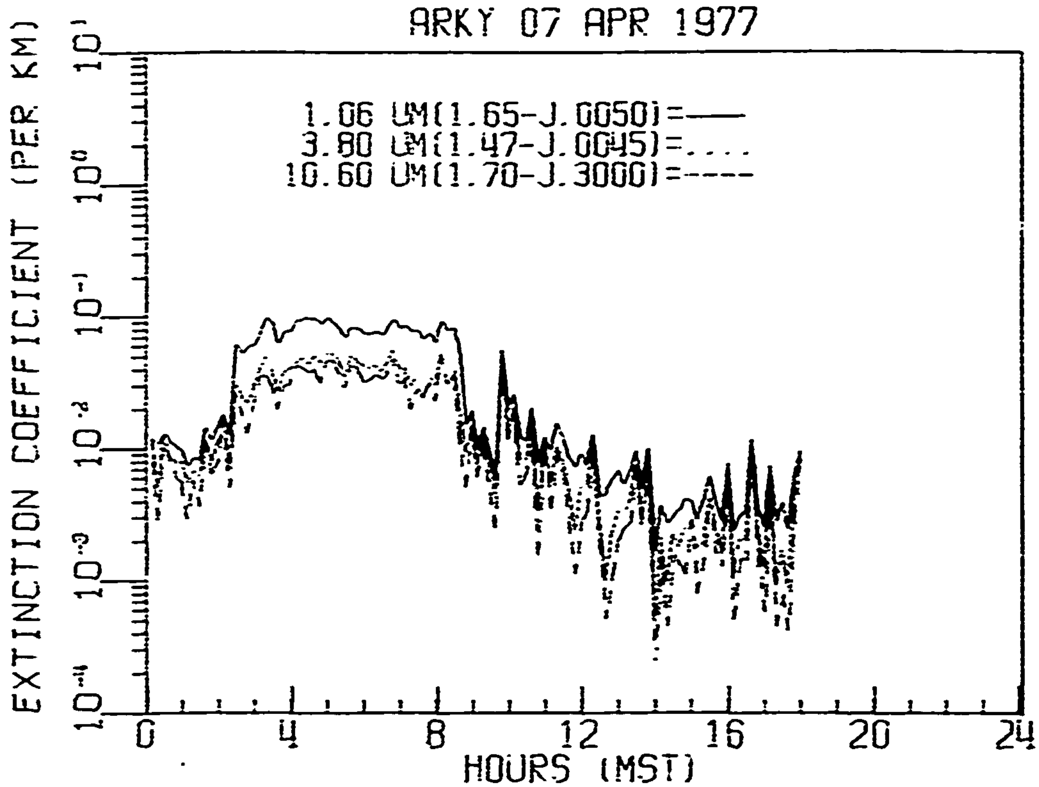


Figure 160. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 7 April 1977.

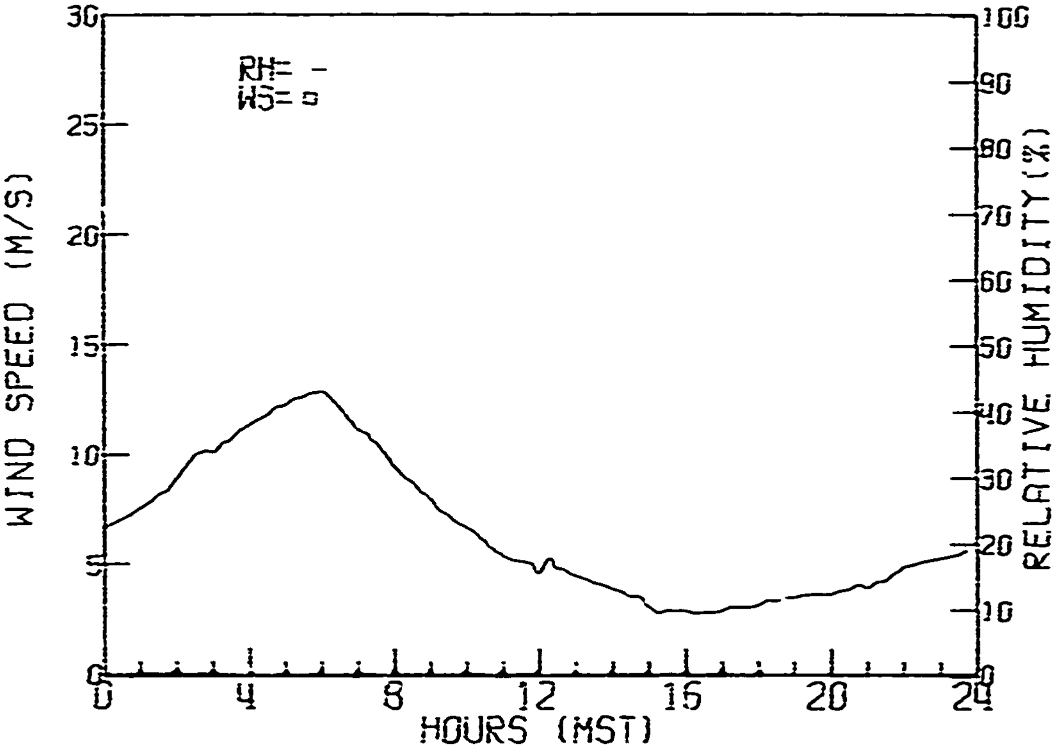


Figure 161. Diurnal variation of windspeed and relative humidity, Arky Site, 7 April 1977.

TABLE 89

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
07 APR 77													
0 : 5:00	600	.26+01	.62+00	.21+00	.61-01	.00	.20-01	.00	.00	.23-01	.15-01	.12-01	144.
0 :15:00	600	.17+01	.45+00	.15+00	.14-01	.00	.00	.00	.00	.11-01	.51-02	.29-02	29.
0 :25:00	600	.45+00	.45+00	.24+00	.46-01	.00	.20-01	.00	.00	.13-01	.13-01	.10-01	120.
0 :35:00	600	.62+00	.49+00	.15+00	.33-01	.95-01	.00	.00	.00	.12-01	.92-02	.58-02	49.
0 :45:00	600	.67+00	.56+00	.15+00	.30-01	.48-01	.00	.00	.00	.11-01	.79-02	.63-02	41.
0 :55:00	600	.69+00	.49+00	.12+00	.61-01	.00	.00	.00	.00	.99-02	.81-02	.56-02	45.
01:05:00	600	.67+00	.39+00	.24+00	.15-01	.00	.00	.00	.00	.76-02	.55-02	.30-02	24.
01:15:00	600	.49+00	.32+00	.15+00	.30-01	.43-01	.00	.00	.00	.84-02	.70-02	.59-02	37.
01:25:00	600	.68+00	.45+00	.18+00	.30-01	.00	.00	.00	.00	.84-02	.63-02	.38-02	32.
01:35:00	600	.75+00	.54+00	.91-01	.33-01	.43-01	.20-01	.00	.00	.15-01	.12-01	.11-01	121.
01:45:00	600	.82+00	.69+00	.15+00	.30-01	.48-01	.00	.00	.00	.12-01	.84-02	.66-02	44.
01:55:00	600	.12+01	.60+00	.43+00	.33-01	.45-01	.00	.00	.00	.15-01	.11-01	.79-02	52.
02:05:00	600	.71+00	.45+00	.15+00	.61-01	.00	.39-01	.00	.00	.18-01	.18-01	.16-01	209.
02:15:00	600	.17+01	.39+00	.21+00	.46-01	.00	.00	.00	.00	.13-01	.79-02	.52-02	46.
02:25'00	600	.91+01	.13+01	.79+00	.76-01	.24+00	.00	.00	.00	.63-01	.31-01	.26-01	183.
02:35:00	600	.93+01	.97+00	.61+00	.76-01	.45-01	.20-01	.00	.00	.55-01	.25-01	.20-01	219.
02:45:00	600	.10+02	.20+01	.49+00	.76-01	.00	.00	.00	.00	.59-01	.23-01	.13-01	187.
02:55:00	600	.13+02	.13+01	.67+00	.91-01	.44-01	.20-01	.00	.00	.63-01	.29-01	.22-01	249.
03:05:00	600	.96+01	.20+01	.55+00	.12+00	.14+00	.39-01	.00	.00	.74-01	.40-01	.35-01	358.
03:15:00	600	.14+02	.29+01	.13+01	.15+00	.21+00	.00	.00	.00	.98-01	.53-01	.39-01	249.
03:25:00	600	.14+02	.26+01	.82+00	.11+00	.19+00	.00	.00	.00	.90-01	.39-01	.29-01	244.
03:35:00	600	.11+02	.15+01	.64+00	.61-01	.45-01	.20-01	.00	.00	.64-01	.28-01	.20-01	225.
03:45:00	600	.11+02	.20+01	.85+00	.11+00	.14+00	.20-01	.00	.00	.76-01	.39-01	.30-01	285.
03:55:00	600	.12+02	.21+01	.64+00	.15+00	.95-01	.20-01	.00	.00	.81-01	.41-01	.31-01	309.
04:05:00	600	.13+02	.19+01	.61+00	.76-01	.24+00	.59-01	.00	.00	.93-01	.46-01	.43-01	455.
04:15:00	600	.15+02	.19+01	.13+01	.17+00	.21+00	.20-01	.00	.00	.99-01	.53-01	.41-01	365.
04:25:00	600	.15+02	.28+01	.64+00	.91-01	.29+00	.20-01	.00	.00	.98-01	.44-01	.38-01	333.
04:35:00	600	.14+02	.26+01	.11+01	.14+00	.11+00	.39-01	.00	.00	.98-01	.51-01	.40-01	414.
04:45:00	600	13+02	.25+01	.12+01	.12+00	.96-01	.20-01	.00	.00	.89-01	.45-01	.32-01	313.
04:55:00	600	.15+02	.25+01	.73+00	.21+00	.19+00	.39-01	.00	.00	.98-01	.54-01	.46-01	451.
05:05:00	600	.11+02	.24+01	.58+00	.12+00	.29+00	.59-01	.00	.00	.92-01	.52-01	.49-01	483.
05:15:00	600	.11+02	.16+01	.11+01	.15+00	.11+00	.39-01	.00	.00	.82-01	.43-01	.39-01	359.
05:25:00	600	.10+02	.17+01	.64+00	.15+00	.19+00	.00	.00	.00	.71-01	.35-01	.29-01	227.
05:35:00	600	.97+01	.20+01	.13+01	.23+00	.11+00	.39-01	.00	.00	.82-01	.52-01	.42-01	412.
05:45:00	600	.99+01	.20+01	.16+01	.76-01	.29+00	.39-01	.00	.00	.82-01	.47-01	.42-01	373.
05:55:00	600	.13+02	.19+01	.93+00	.18+00	.95-01	.20-01	.00	.00	.75-01	.42-01	.33-01	312.
06:05:00	600	.99+01	.18+01	.76+00	.17+00	.14+00	.20-01	.00	.00	.74-01	.41-01	.33-01	307.
06:15:00	600	.13+02	.22+01	.85+00	.12+00	.21+00	.20-01	.00	.00	.79-01	.44-01	.37-01	309.
06:25:00	600	.99+01	.16+01	.70+00	.76-01	.19+00	.39-01	.00	.00	.73-01	.39-01	.34-01	342.
06:35:00	600	.11+02	.19+01	.77+00	.91-01	.00	.79-01	.00	.00	.81-01	.45-01	.37-01	487.
06:45:00	600	.12+02	.17+01	.88+00	.15+00	.14+00	.79-01	.00	.00	.96-01	.56-01	.49-01	598.

TABLE B9 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UGM/M**3)
07 APR 77													
06:55:00	600	.12+02	.24+01	.16+01	.76-01	.19+00	.20-01	.00	.00	.85-01	.42-01	.33-01	295.
07:05:00	600	.13+02	.21+01	.73+00	.71-01	.21+00	.20-01	.00	.00	.85-01	.40-01	.34-01	306.
07:15:00	600	.13+02	.24+01	.52+00	.76-01	.00	.20-01	.00	.00	.78-01	.30-01	.20-01	284.
07:25:00	600	.11+02	.20+01	.91+00	.76-01	.11+00	.20-01	.00	.00	.76-01	.37-01	.29-01	271.
07:35:00	600	.10+02	.19+01	.94+00	.11+00	.48-01	.20-01	.00	.00	.70-01	.36-01	.25-01	263.
07:45:00	600	.11+02	.16+01	.73+00	.00	.45-01	.77-01	.00	.00	.75-01	.38-01	.32-01	435.
07:55:00	600	.10+02	.17+01	.49+00	.15+00	.96-01	.00	.00	.00	.65-01	.33-01	.23-01	204.
08:05:00	600	.11+02	.20+01	.92+00	.22+00	.45+00	.20-01	.00	.00	.92-01	.55-01	.52-01	392.
08:15:00	600	.12+02	.19+01	.67+00	.17+00	.00	.39-01	.00	.00	.81-01	.41-01	.31-01	375.
08:25:00	600	.11+02	.21+01	.73+00	.71-01	.19+00	.37-01	.00	.00	.81-01	.43-01	.37-01	365.
08:35:00	600	.11+02	.15+01	.30+00	.41-01	.00	.00	.00	.00	.57-01	.20-01	.13-01	148.
08:45:00	600	.17+01	.92+00	.53+00	.33-01	.00	.00	.00	.00	.16-01	.95-02	.52-02	46.
08:55:00	600	.13+01	.56+00	.27+00	.61-01	.14+00	.00	.00	.00	.19-01	.15-01	.14-01	84.
09:05:00	600	.65+00	.51+00	.15+00	.33-01	.45-01	.00	.00	.00	.13-01	.77-02	.53-02	41.
09:15:00	600	.66+00	.62+00	.21+00	.46-01	.00	.20-01	.00	.00	.35-01	.13-01	.10-01	123.
09:35:00	***	.55+00	.28+00	.23+00	.15-01	.00	.00	.00	.00	.52-02	.45-02	.26-02	20.
09:45:00	600	.27+01	.16+01	.88+00	.14+00	.24+00	.59-01	.00	.00	.56-01	.49-01	.45-01	422.
09:55:00	600	.17+01	.77+00	.24+00	.61-01	.95-01	.00	.00	.00	.23-01	.14-01	.12-01	79.
10:05:00	600	.16+01	.67+00	.46+00	.00	.96-01	.39-01	.00	.00	.26-01	.21-01	.19-01	209.
10:15:00	600	.13+01	.43+00	.27+00	.16-01	.00	.00	.00	.00	.12-01	.85-02	.54-02	46.
10:25:00	600	.75+00	.69+00	.19+00	.30-01	.48-01	.00	.00	.00	.12-01	.84-02	.66-02	46.
10:35:00	600	.13+01	.54+00	.24+00	.11+00	.00	.20-01	.00	.00	.23-01	.18-01	.15-01	161.
10:45:00	600	.12+01	.34+00	.19+00	.00	.00	.00	.00	.00	.79-02	.34-02	.16-02	16.
10:55:00	600	.61+00	.30+00	.27+00	.30-01	.00	.20-01	.00	.00	.12-01	.11-01	.72-02	112.
11:05:00	600	.12+01	.49+00	.41-01	.30-01	.00	.00	.00	.00	.98-02	.56-02	.36-02	73.
11:15:00	600	.15+01	.41+00	.14+00	.00	.45-01	.20-01	.00	.00	.16-01	.13-01	.77-02	109.
11:25:00	600	.12+01	.32+00	.33+00	.15-01	.48-01	.00	.00	.00	.12-01	.81-02	.60-02	38.
11:35:00	600	.11+01	.34+00	.15+00	.15-01	.00	.00	.00	.00	.86-02	.49-02	.27-02	25.
11:45:00	600	.12+01	.45+00	.30-01	.00	.00	.00	.00	.00	.74-02	.24-02	.11-02	15.
11:55:00	600	.11+01	.43+00	.14+00	.15-01	.00	.00	.00	.00	.91-02	.52-02	.29-02	26.
12:05:00	600	.82+00	.28+00	.15+00	.30-01	.00	.00	.00	.00	.77-02	.54-02	.34-02	30.
12:15:00	600	.11+01	.24+00	.33-01	.46-01	.00	.20-01	.00	.00	.13-01	.95-02	.72-02	117.
12:25:00	600	.43+00	.26+00	.61-01	.15-01	.00	.00	.00	.00	.45-02	.29-02	.18-02	16.
12:35:00	600	.96+00	.17+00	.00	.00	.00	.00	.00	.00	.47-02	.13-02	.53-03	9.
12:45:00	600	.95+00	.26+00	.91-01	.00	.00	.00	.00	.00	.59-02	.23-02	.11-02	12.
12:55:00	600	.13+01	.24+00	.91-01	.15-01	.00	.00	.00	.00	.58-02	.34-02	.21-02	22.
13:05:00	600	.82+00	.64-01	.30-01	.30-01	.00	.00	.00	.00	.54-02	.32-02	.26-02	24.
13:15:00	600	.77+00	.30+00	.33-01	.33-01	.00	.00	.00	.00	.66-02	.41-02	.29-02	27.
13:25:00	600	.76+00	.17+00	.91-01	.15-01	.00	.20-01	.00	.00	.97-02	.77-02	.72-02	98.
13:35:00	600	.57+00	.15+00	.33-01	.00	.45-01	.00	.00	.00	.51-02	.27-02	.31-02	16.
13:45:00	600	.91+00	.19+00	.30-01	.15-01	.48-01	.20-01	.00	.00	.10-01	.86-02	.94-02	105.

TABLE 89 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.9	10.6	MASS LOADING (UG/M**3)
07 APR 77													
13:55:00	600	.37+00	.00	.30-01	.00	.00	.00	.00	.00	.17-02	.49-03	.26-03	3.
14:05:00	600	.53+00	.13+00	.30-01	.15-01	.00	.00	.00	.00	.38-02	.22-02	.15-02	14.
14:15:00	600	.48+00	.13+00	.30-01	.00	.00	.00	.00	.00	.20-02	.99-03	.47-03	6.
14:25:00	600	.33+00	.96-01	.61-01	.15-01	.00	.00	.00	.00	.31-02	.23-02	.16-02	13.
14:35:00	600	.48+00	.13+00	.00	.15-01	.00	.00	.00	.00	.34-02	.18-02	.14-02	13.
14:45:00	600	.45+00	.19+00	.15+00	.00	.00	.00	.00	.00	.41-02	.25-02	.11-02	9.
14:55:00	600	.35+00	.11+00	.30-01	.00	.48-01	.00	.00	.00	.41-02	.24-02	.24-02	14.
15:05:00	600	.37+00	.96-01	.12+00	.00	.00	.00	.00	.00	.29-02	.13-02	.92-03	5.
15:15:00	600	.62+00	.15+00	.00	.15-01	.00	.00	.00	.00	.41-02	.20-02	.14-02	15.
15:25:00	600	.55+00	.15+00	.61-01	.15-01	.43-01	.00	.00	.00	.62-02	.42-02	.42-02	25.
15:35:00	600	.42+00	.17+00	.61-01	.15-01	.00	.00	.00	.00	.39-02	.26-02	.17-02	15.
15:45:00	600	.41+00	.96-01	.00	.15-01	.00	.00	.00	.00	.29-02	.15-02	.13-02	12.
15:55:00	600	.48+00	.21+00	.30-01	.46-01	.48-01	.00	.00	.00	.77-02	.64-02	.62-02	41.
16:05:00	600	.41+00	.64-01	.61-01	.00	.00	.00	.00	.00	.24-02	.11-02	.51-03	5.
16:15:00	600	.33+00	.13+00	.30-01	.15-01	.00	.00	.00	.00	.31-02	.21-02	.15-02	13.
16:25:00	600	.45+00	.11+00	.30-01	.15-01	.00	.00	.00	.00	.35-02	.21-02	.15-02	14.
16:35:00	600	.57+00	.13+00	.61-01	.00	.00	.39-01	.00	.00	.12-01	.11-01	.11-01	160.
16:45:00	600	.35+00	.13+00	.61-01	.15-01	.00	.00	.00	.00	.35-02	.21-02	.16-02	14.
16:55:00	600	.35+00	.13+00	.61-01	.00	.00	.00	.00	.00	.26-02	.13-02	.58-03	5.
17:05:00	600	.50+00	.64-01	.91-01	.00	.00	.20-01	.00	.00	.74-02	.51-02	.59-02	47.
17:15:00	600	.52+00	.11+00	.30-01	.00	.00	.00	.00	.00	.29-02	.93-03	.45-03	6.
17:25:00	600	.53+00	.20+00	.61-01	.00	.00	.00	.00	.00	.39-02	.17-02	.79-03	5.
17:35:00	600	.43+00	.11+00	.30-01	.00	.00	.00	.00	.00	.25-02	.89-03	.43-03	5.
17:45:00	600	.63+00	.28+00	.61-01	.30-01	.00	.00	.00	.00	.61-02	.43-02	.29-02	26.
17:55:00	600	.51+00	.21+00	.30-01	.00	.48-01	.20-01	.00	.00	.95-02	.75-02	.84-02	96.

$FIN

Weather Summary

Date: 8 April 1977

Synoptic

Surface: Weak high centered over central Colorado.

500 Millibar: Weak ridge over Rocky Mountains with light northwesterly flow over New Mexico.

Holloman AFB

Clouds: Clear early morning. Scattered cumulus 1200-2000 m AGL during daylight hours.

Wind: Light and variable with peak wind of 7 m sec^{-1} from the northwest during midafternoon.

Visibility: Greater than 60 km.

Maximum temperature:	29.4°C	Corresponding vapor pressure:	5.0 Torr
Minimum temperature:	7.2°C	Corresponding vapor pressure:	2.5 Torr

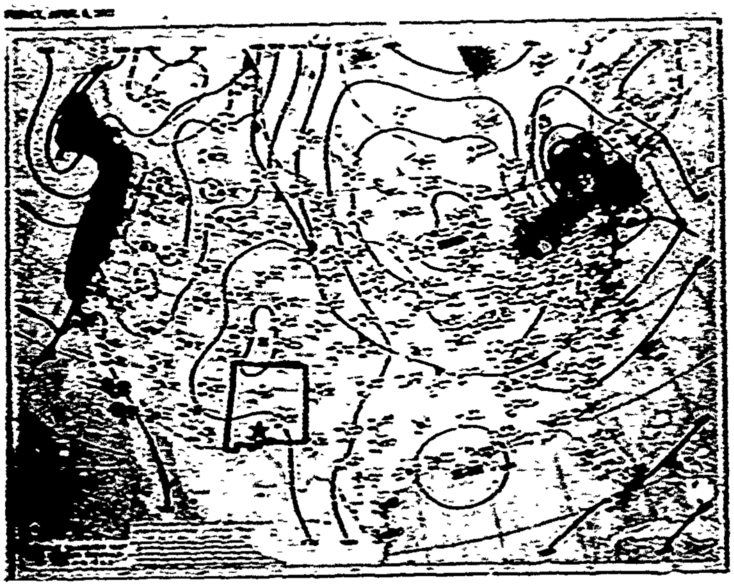


Figure 162a. Surface weather map for 8 April 1977.

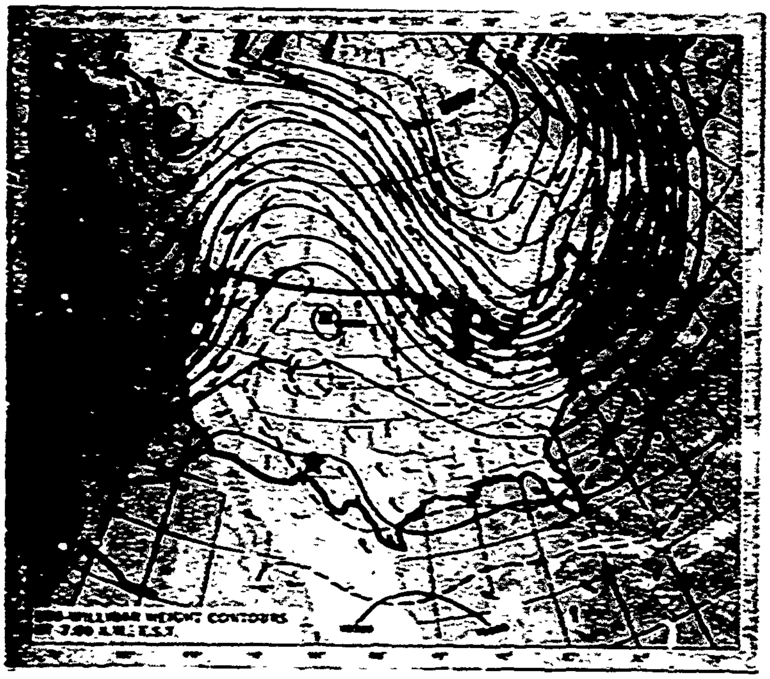


Figure 162b. 500-millibar height contours for 8 April 1977.

TABLE 90. LSTC DAILY LOG OF TEMPERATURE, MOISTURE, CLOUD COVER, AND REMARKS

Hour	Dry Bulb Temp (°C)	Vapor Pressure (Torr)	Dew Point (°C)	Clouds Low %/Type	Clouds Mid %/Type	Clouds High %/Type	Date: 6 April 1977 Remarks
0100	11.7	2.1	-10.3	0	0	0	
0200	11.6	2.7	-7.3	0	0	0	
0300	9.6	2.4	-8.4	0	0	0	0300-180° shift all parameters at LSTC
0400	5.7	2.1	-10.4	0	0	0	
0500	2.2	1.7	-12.7	0	0	0	
0600	2.2	2.1	-10.2	0	0	0	
0700	8.9	2.5	-8.1	0	0	0	
0800	13.3	2.9	-6.3	0	0	0	
0900	17.0	3.1	-5.3	0	0	0	
1000	21.8	3.2	-4.7	0	0	0	Few Cu E Apache ok - cal ΛT/C's and Bal ΛT's 0928-0950
1100	24.0	3.7	-2.8	0	0	0	Few Cu E LSTC 32 ΛT out - could not recal
1200	26.5	5.7	3.0	10 Cu	0	0	
1300	27.5	2.6	-7.5	10 Cu	0	0	
1400	27.5	2.7	-7.0	10 Cu	0	0	
1500	29.4	2.5	-7.9	10 Cu	0	0	
1600	28.0	3.0	-5.5	10 Cu	0	0	
1700	28.0	3.0	-5.5	10 Cu	0	0	
1800	26.7	2.9	-5.9	10 Cu	0	0	
1900	23.9	3.3	-4.3	0	0	0	Few Cu S
2000	19.1	2.6	-7.4	0	0	0	
2100	17.5	3.1	-5.1	0	0	0	
2200	16.6	2.8	-6.7	0	0	0	
2300	14.4	2.7	-7.3	0	0	0	
2400	13.3	2.3	-8.9	0	0	0	

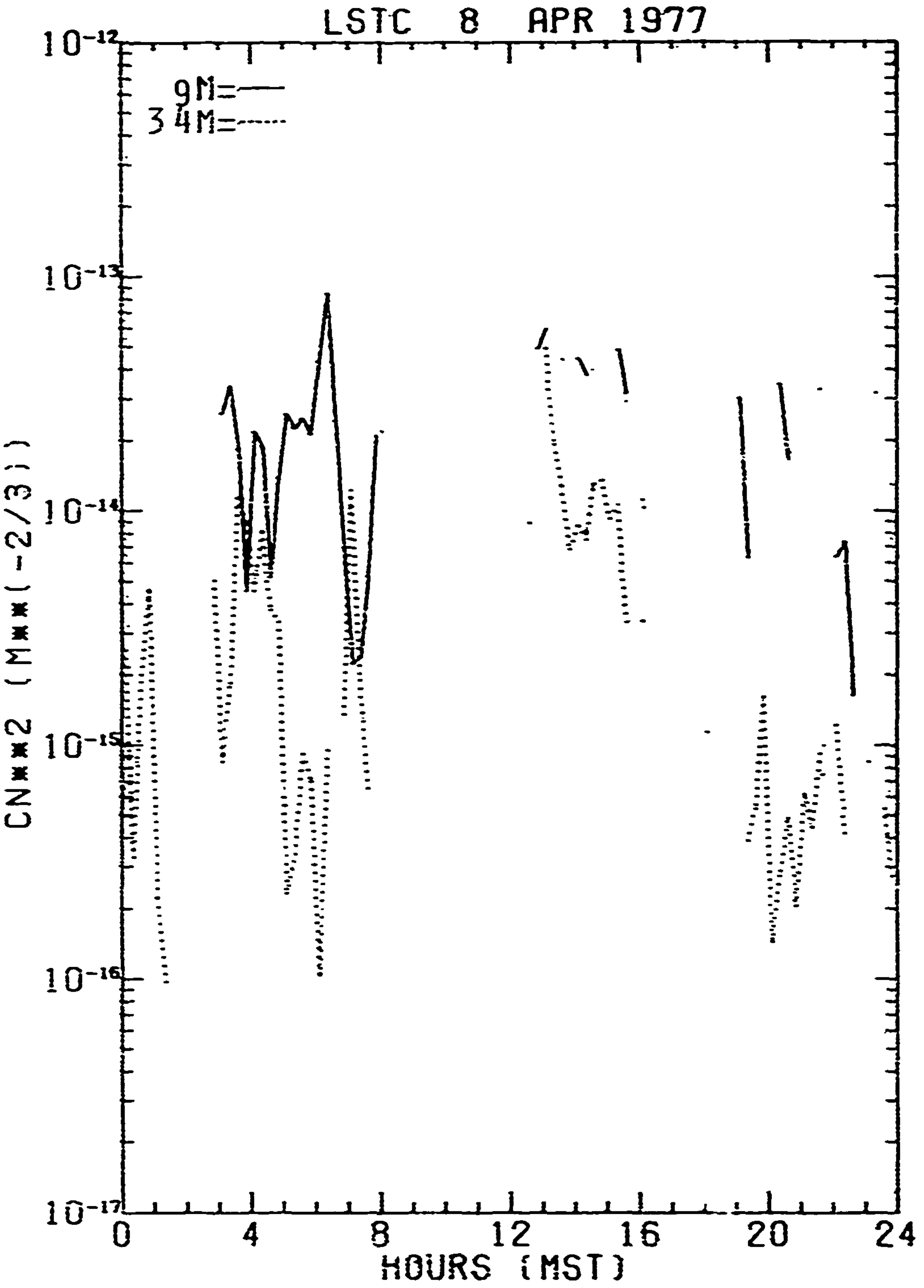


Figure 163. Diurnal variation of the atmospheric structure parameter, C_N^2, at the LSTC for the 9 and 34 m tower levels, 8 April 1977.

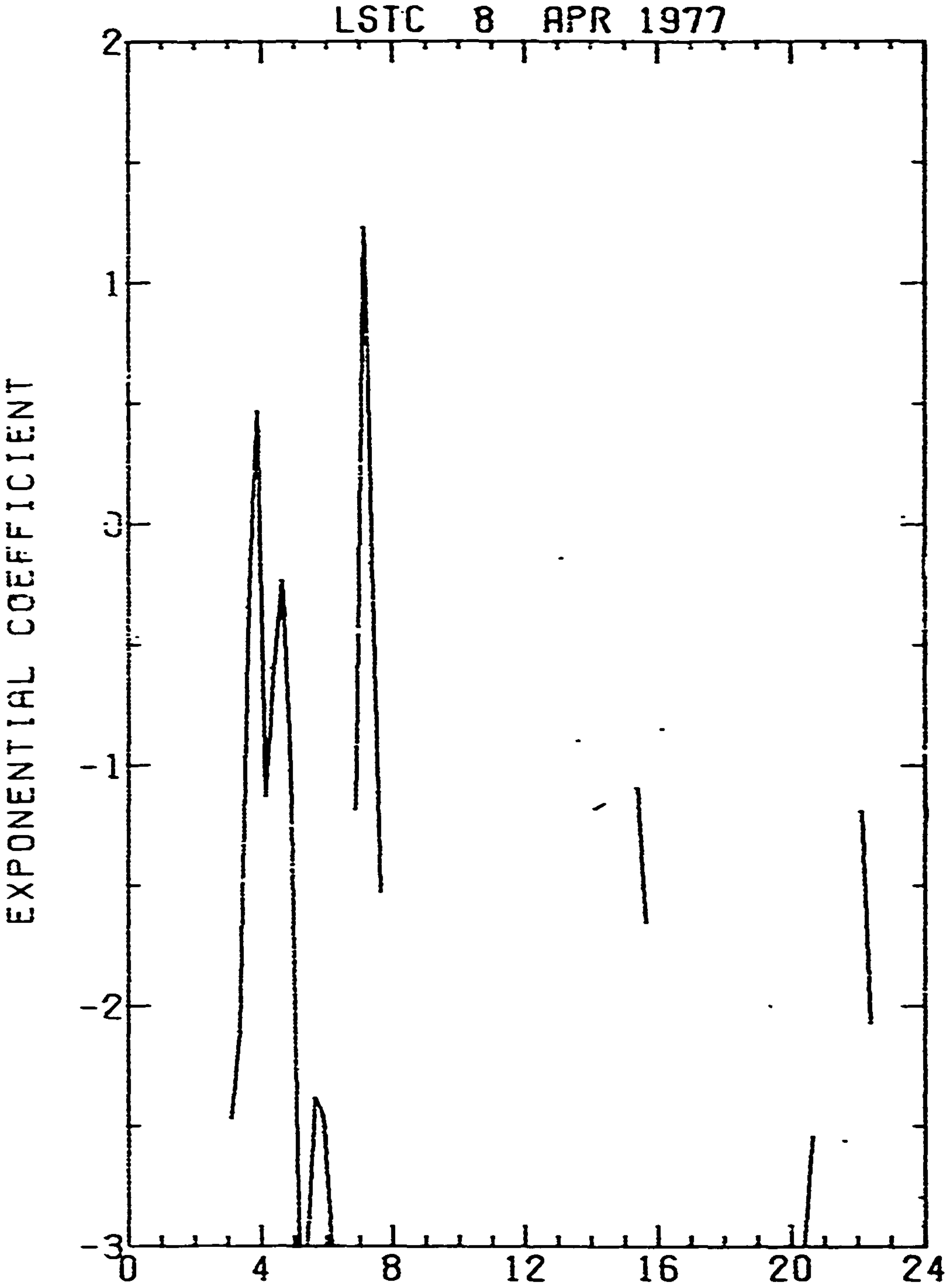


Figure 164. Diurnal variation of the altitude change of C_N^2 between the 9 and 34 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, LSTC, 8 April 1977.

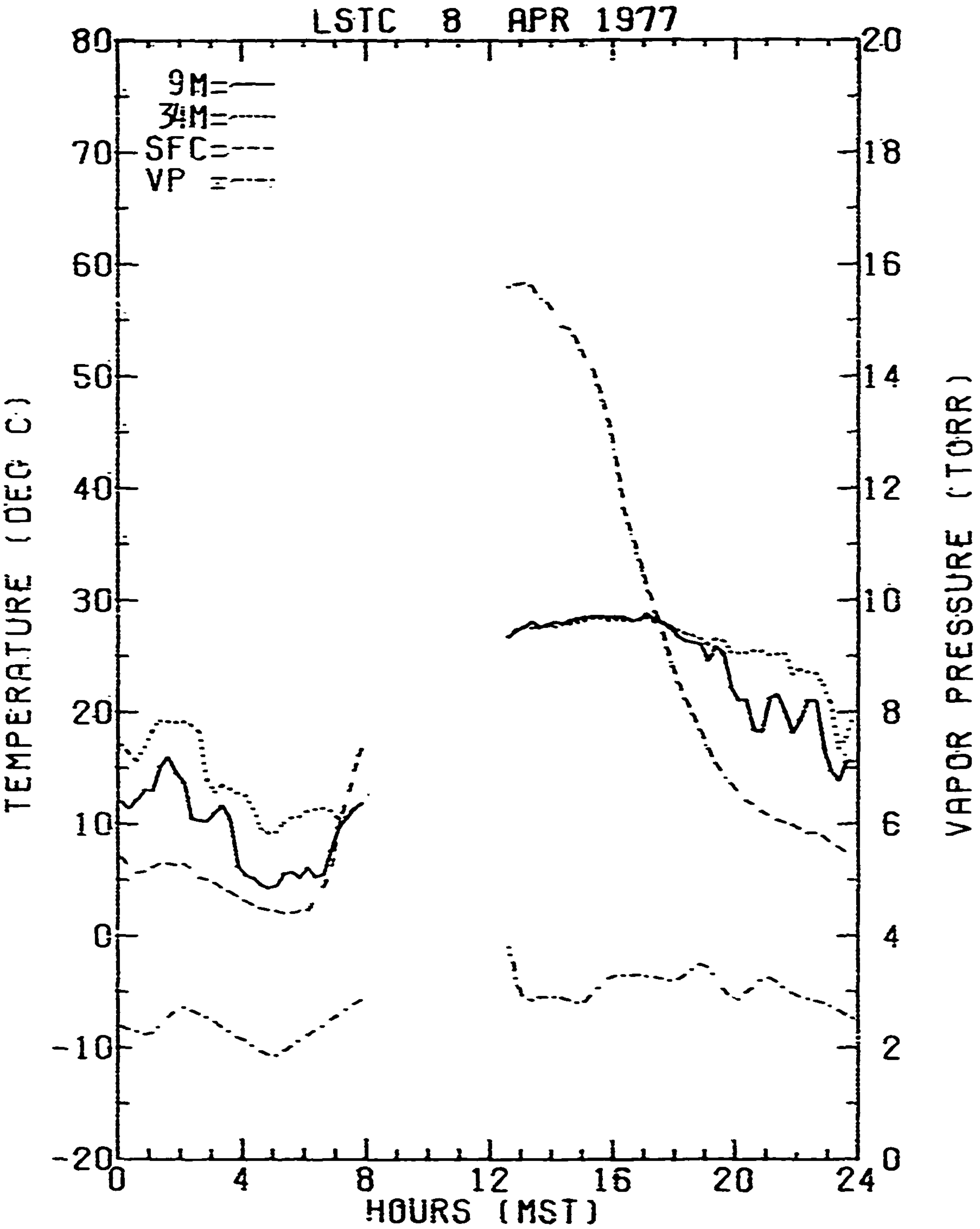


Figure 165. Diurnal variation of surface soil temperature, air temperatures at the 9 and 34 m tower levels, and vapor pressure at 2 m level, LSTC, 8 April 1977.

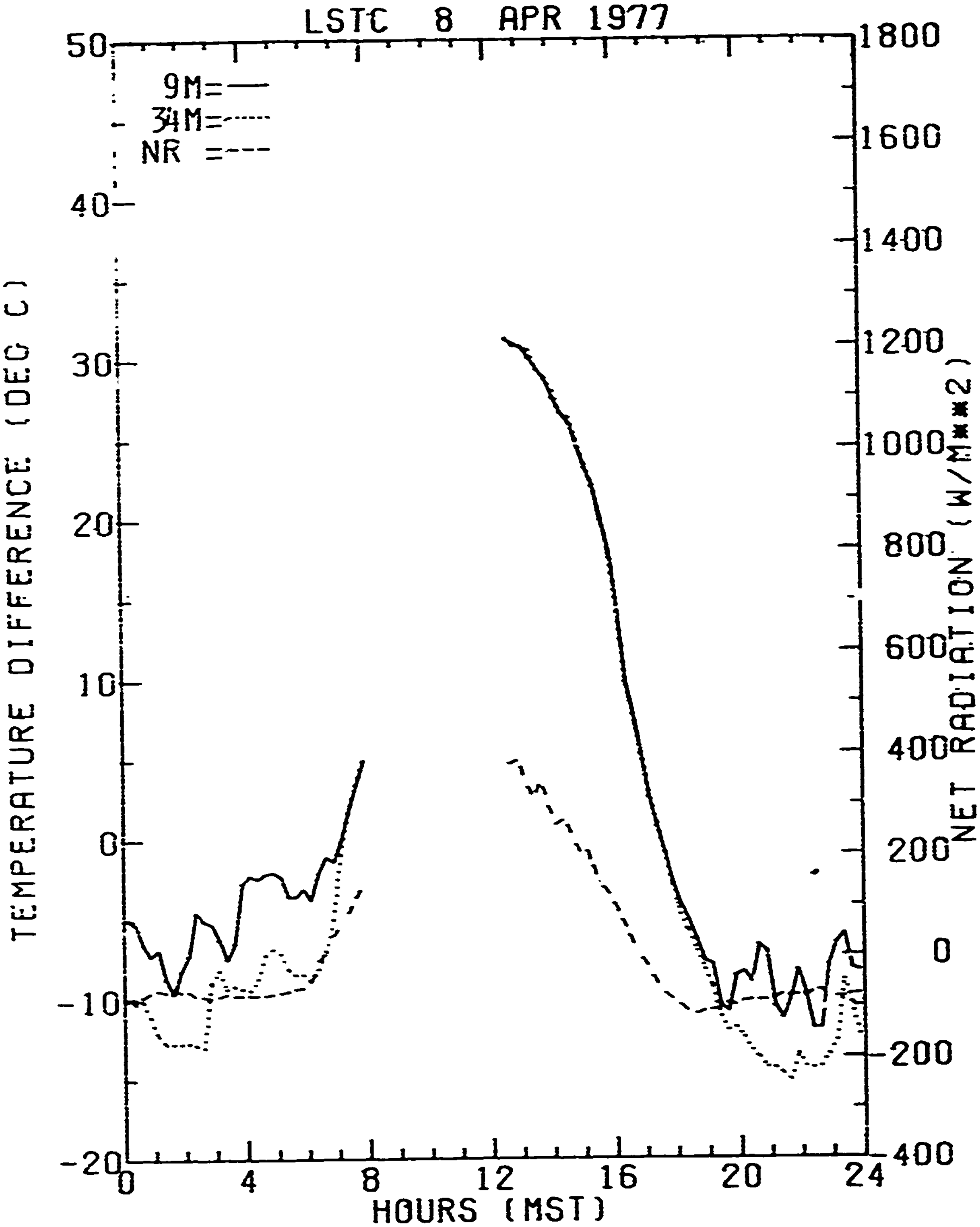


Figure 166. Diurnal variation of the difference in temperature between soil surface and 9 m and soil surface and 34 m, and net radiation at the 1 m level, LSTC, 8 April 1977.

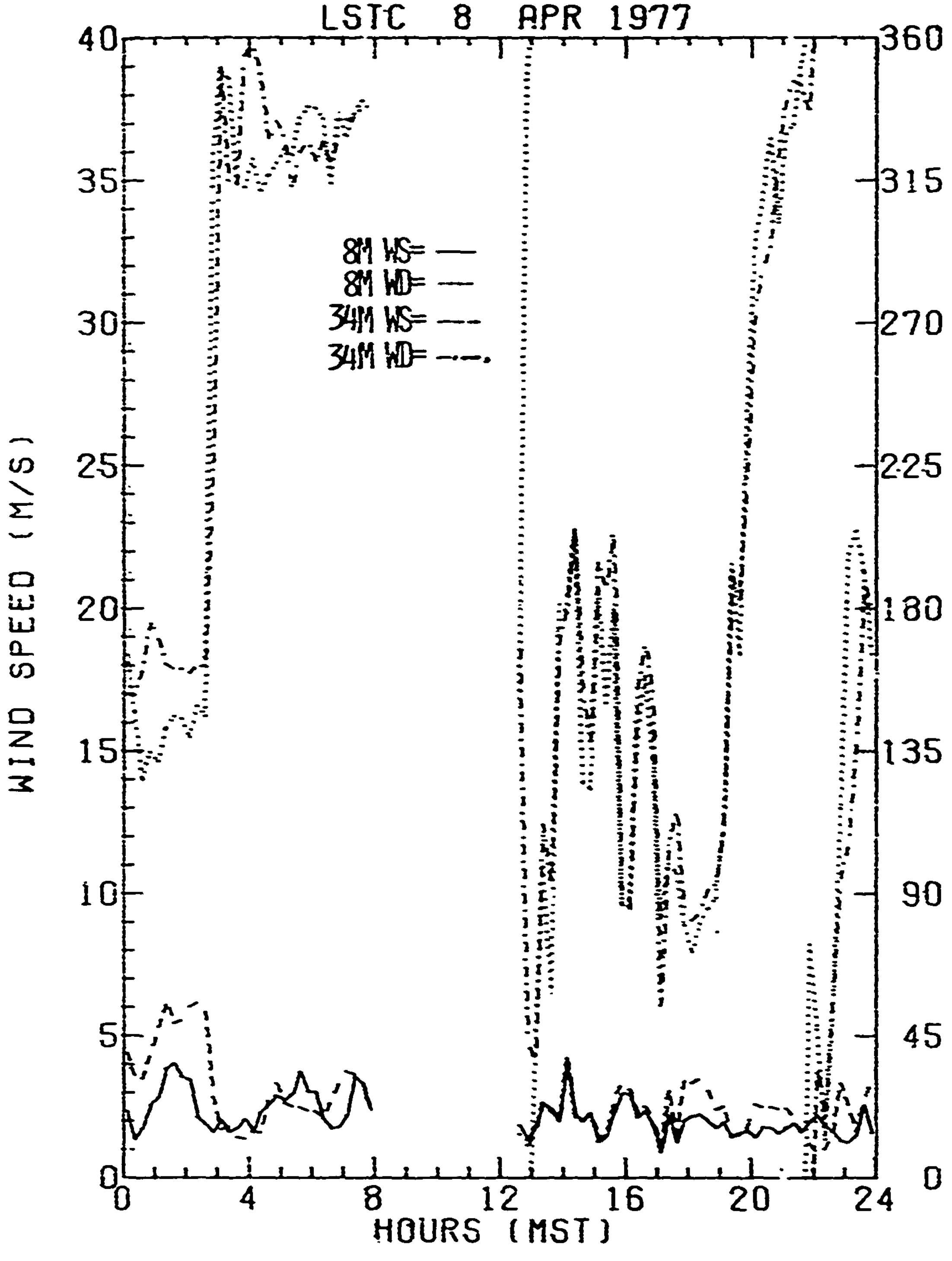


Figure 167. Diurnal variation of windspeed and wind direction at the 8 and 34 m tower levels, LSTC, 8 April 1977.

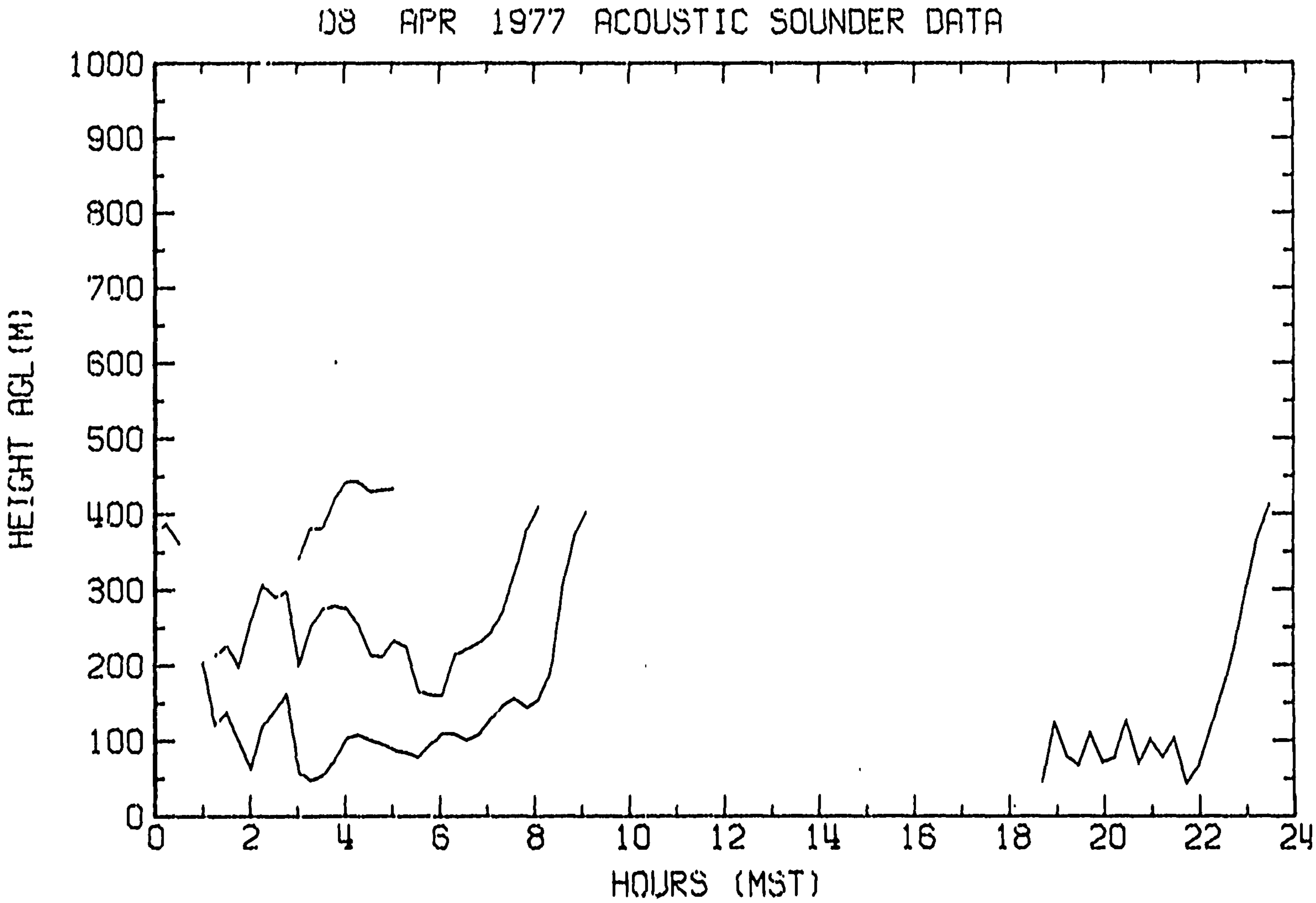


Figure 168. Inversion heights, LSTC, 8 April 1977.

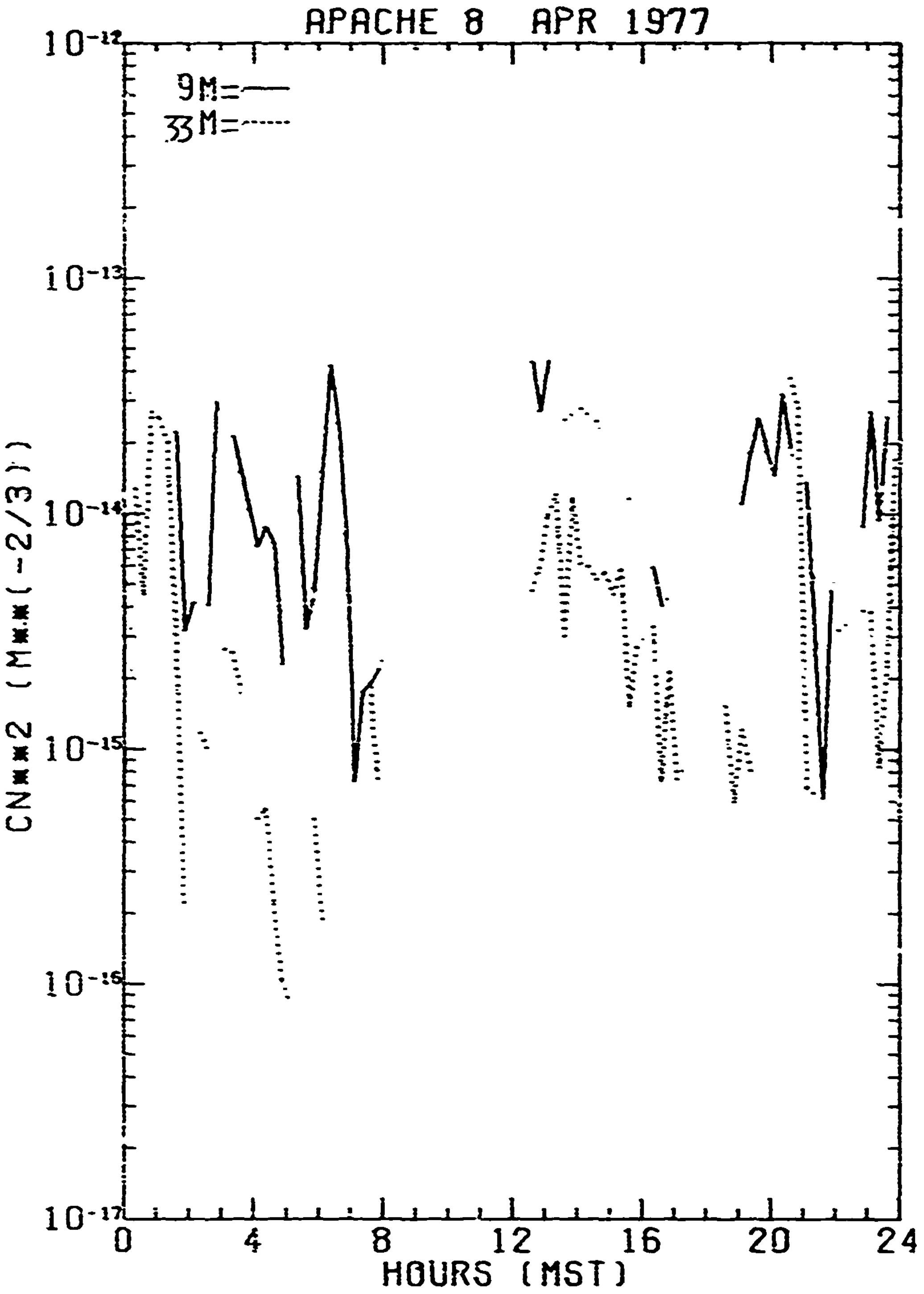


Figure 169. Diurnal variation of the atmospheric structure parameter, C_N^2, at the Apache Site for the 9 and 33 m tower levels, 8 April 1977.

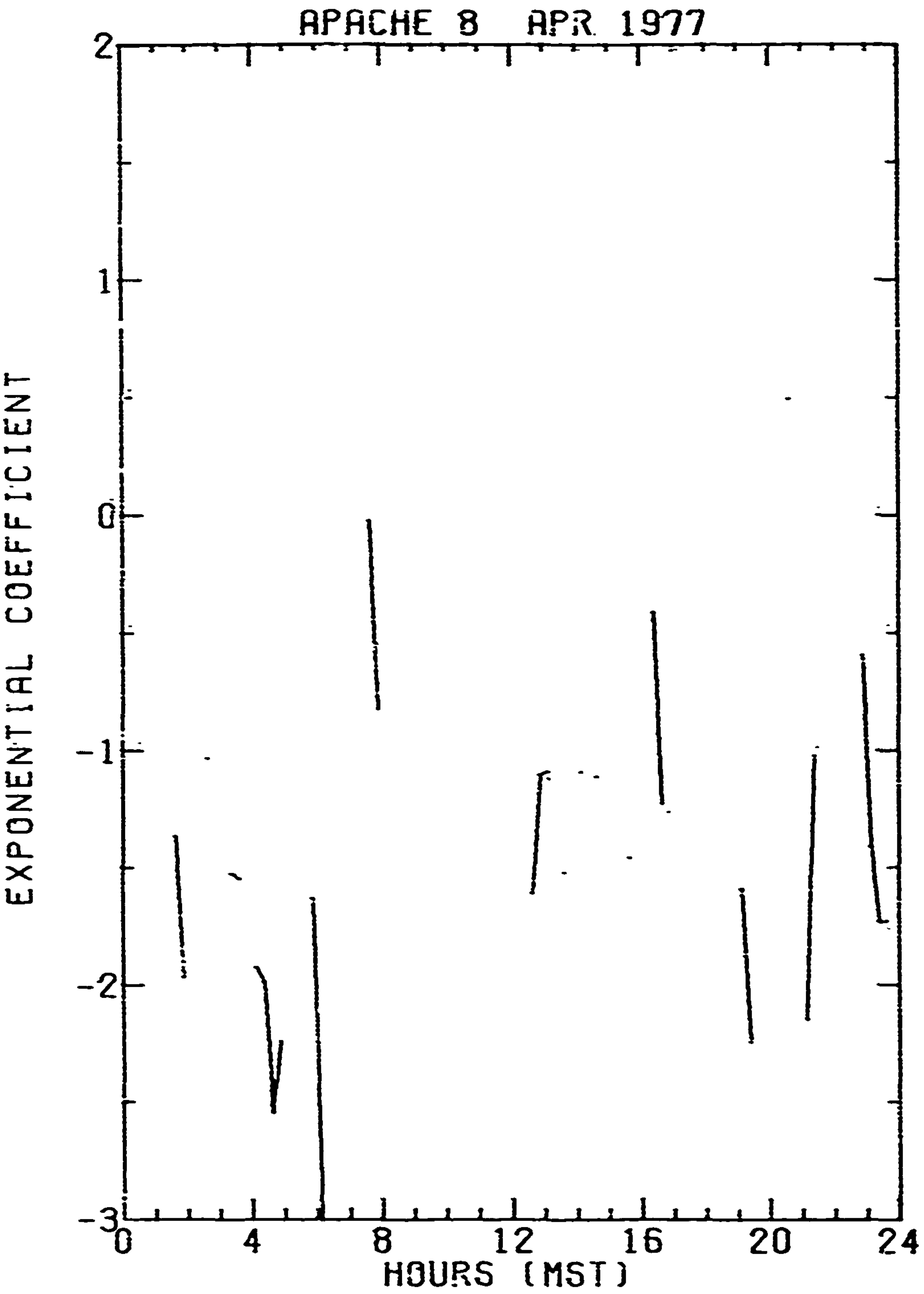


Figure 170. Diurnal variation of the altitude change of C_N^2 between the 9 and 33 m levels. The exponential coefficient (a) for $C_N^2(z) = z^a k$ is plotted where z is the altitude and k is the 1 m C_N^2 value, Apache Site, 8 April 1977.

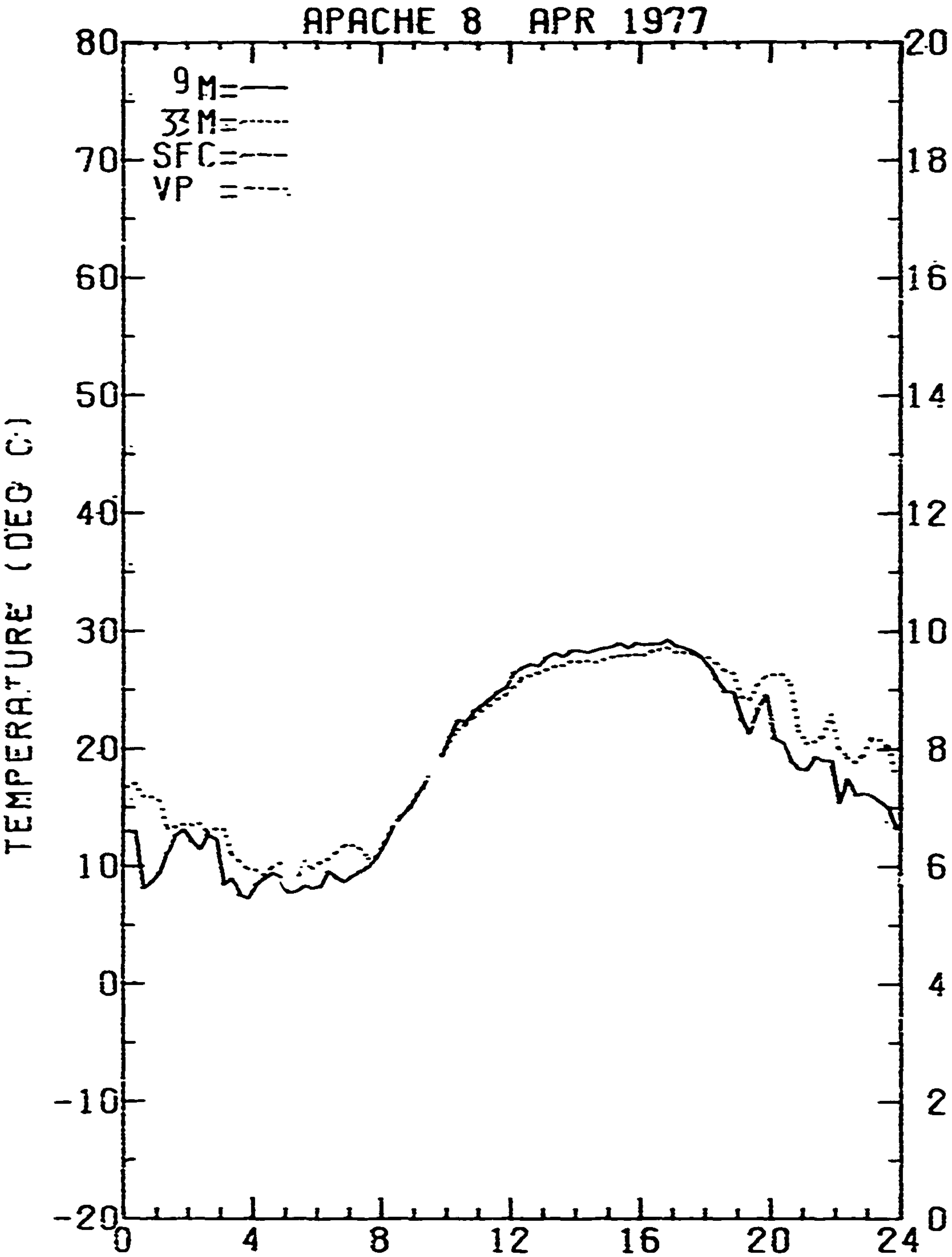


Figure 171. Diurnal variation of surface soil temperature, air temperatures at the 9 and 33 m tower levels, and vapor pressure at 2 m level, Apache Site, 8 April 1977.

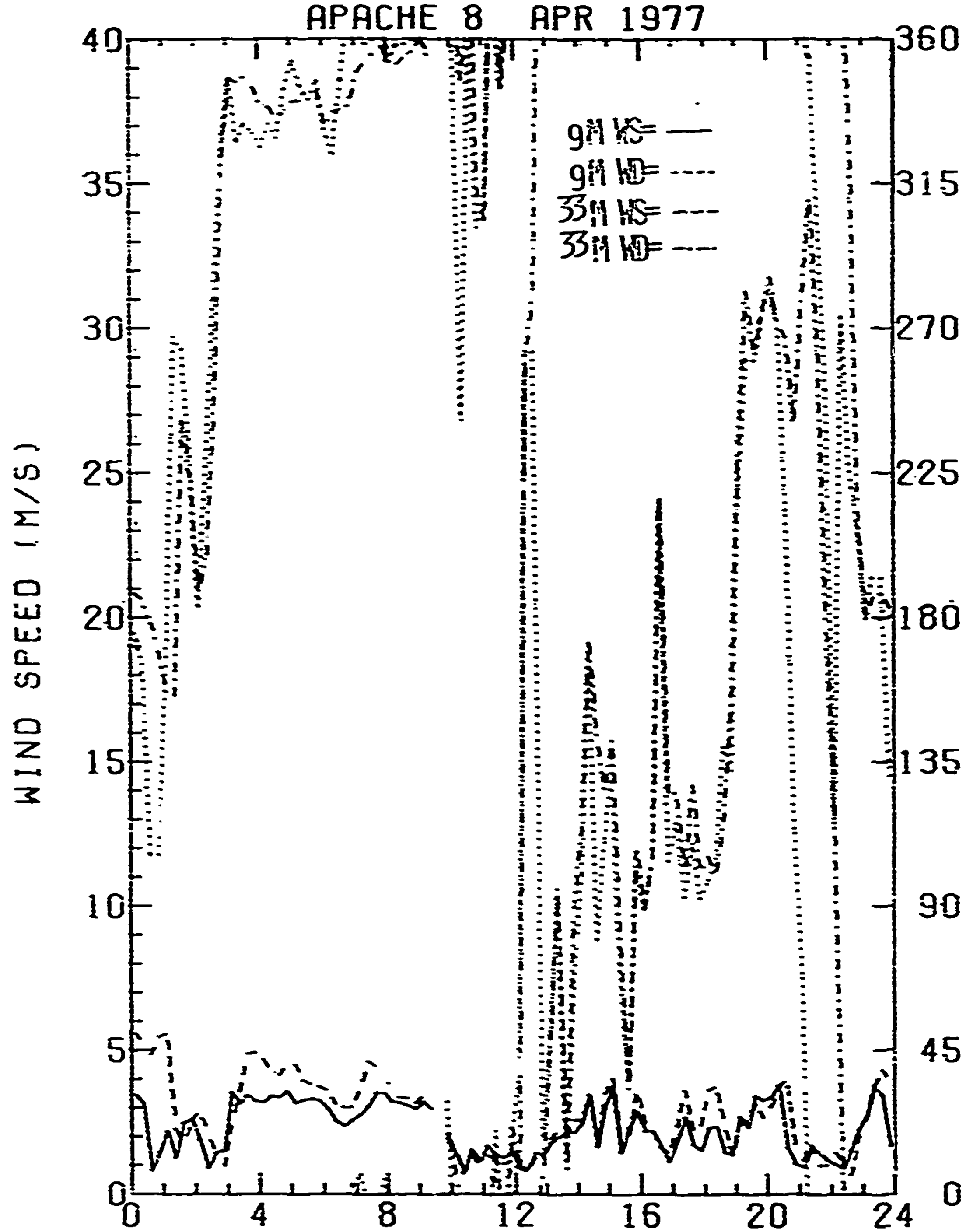


Figure 172. Diurnal variation of windspeed and wind direction at the 8 and 32 m tower levels, Apache Site, 8 April 1977.

TABLE 91
APACHE SITE RAWINSONDE DATA

DATE: 08 APR 77 RELEASE NO.: 54 RELEASE TIME: 0500 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	665.0	5.8	2.2	330.0	4.1
32.7	662.4	12.1	2.9	0.0	0.0
134.3	654.4	14.5	3.4	0.0	0.0
356.9	637.5	16.5	3.7	0.0	0.0
1000.9	591.0	15.9	3.5	0.0	0.0
1989.5	525.0	6.1	2.0	266.0	3.6
2250.5	508.5	3.9	1.7	271.0	3.6
3723.7	422.2	-10.4	0.7	292.9	4.3

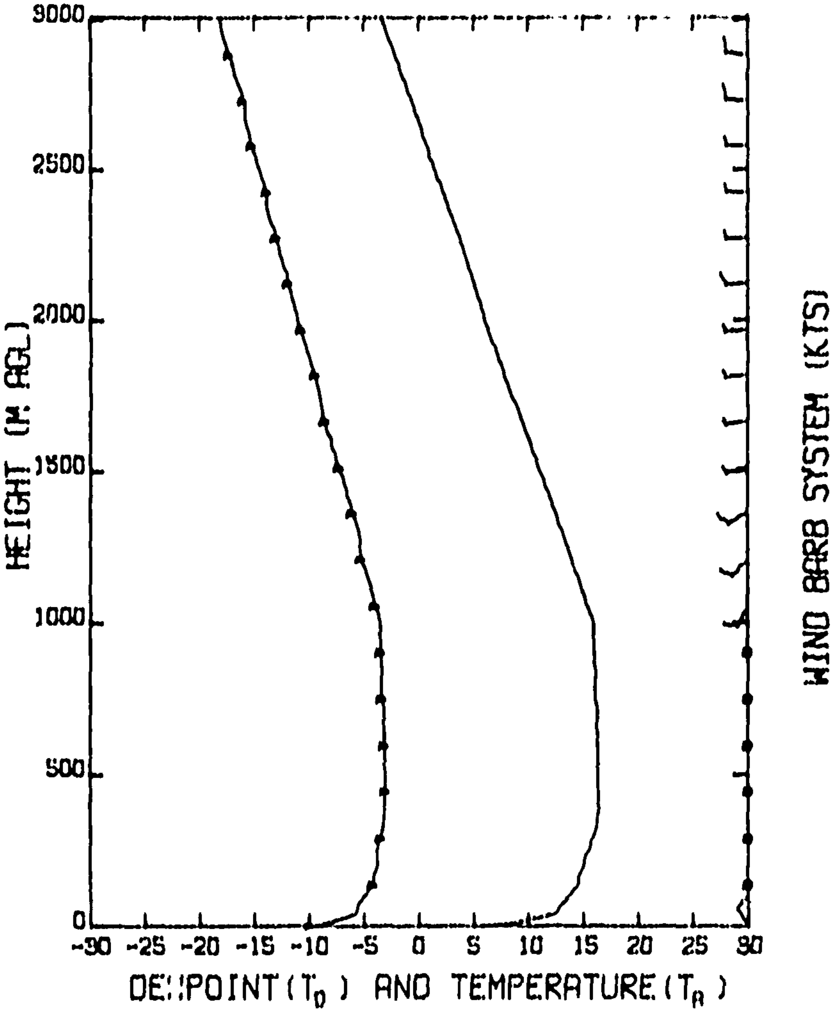


TABLE 92
APACHE SITE RAWINSONDE DATA

DATE: 00 APR 77 RELEASE NO.: 55 RELEASE TIME: 1200 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	665.1	25.8	3.5	0.0	0.0
370.0	637.5	22.1	3.8	163.0	0.5
2010.0	525.0	6.8	1.5	178.0	2.6
3608.3	429.9	-8.4	0.9	213.5	1.4

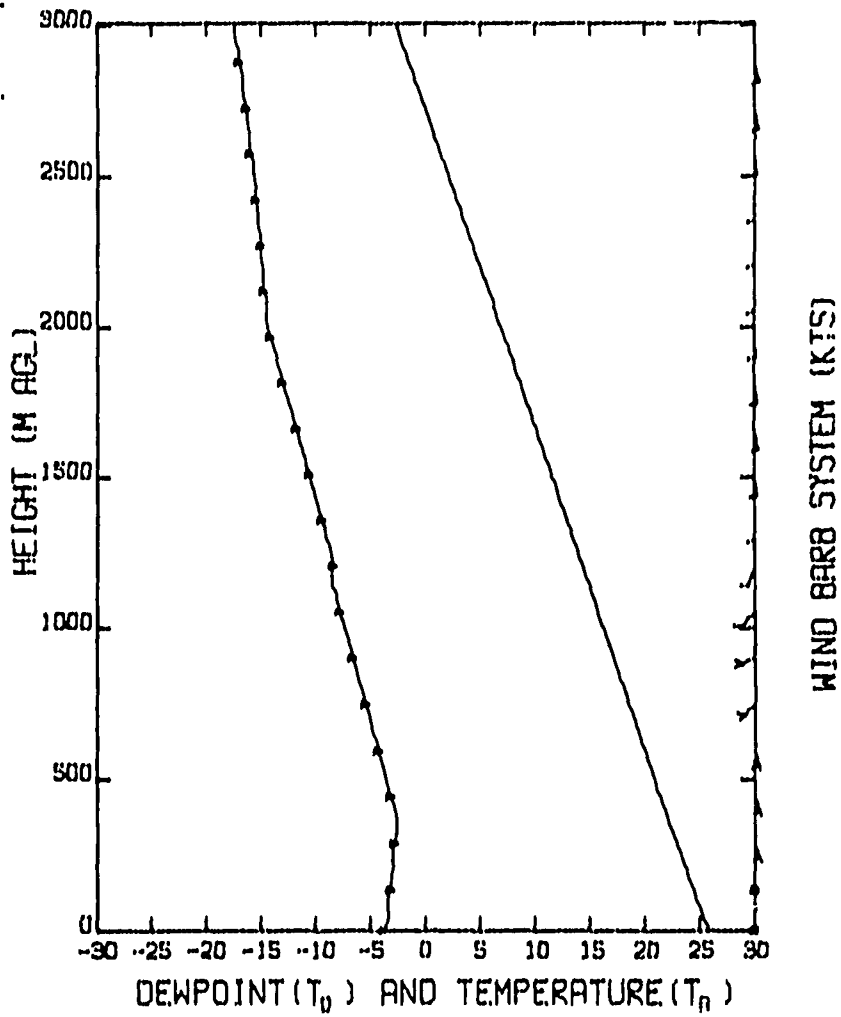


TABLE 93
APACHE SITE RAWINSONDE DATA

DATE: 08 APR 77 RELEASE NO.: 56 RELEASE TIME: 1800 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	661.9	27.5	8.0	90.0	2.1
331.3	637.5	24.4	5.3	0.0	0.0
1353.1	566.1	14.6	2.6	0.0	0.0
1983.2	525.0	8.2	2.1	0.0	0.0
3023.8	461.8	-1.7	1.5	0.0	0.0
3934.5	411.2	-10.6	1.0	243.1	4.3

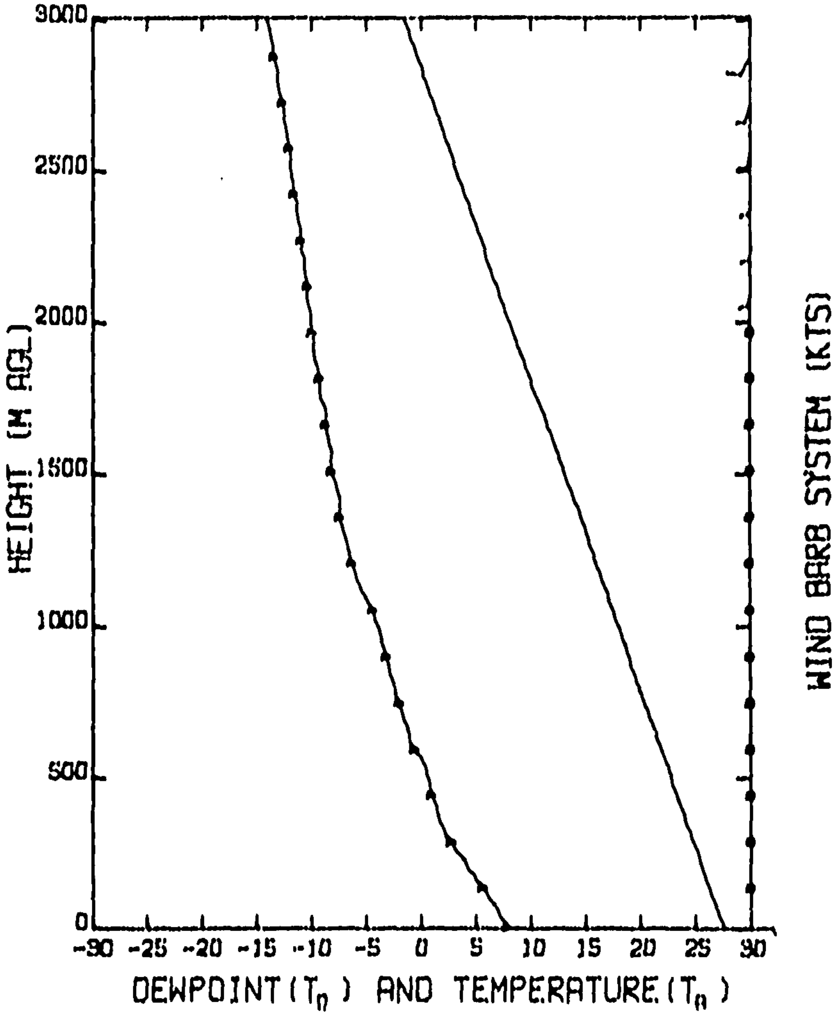
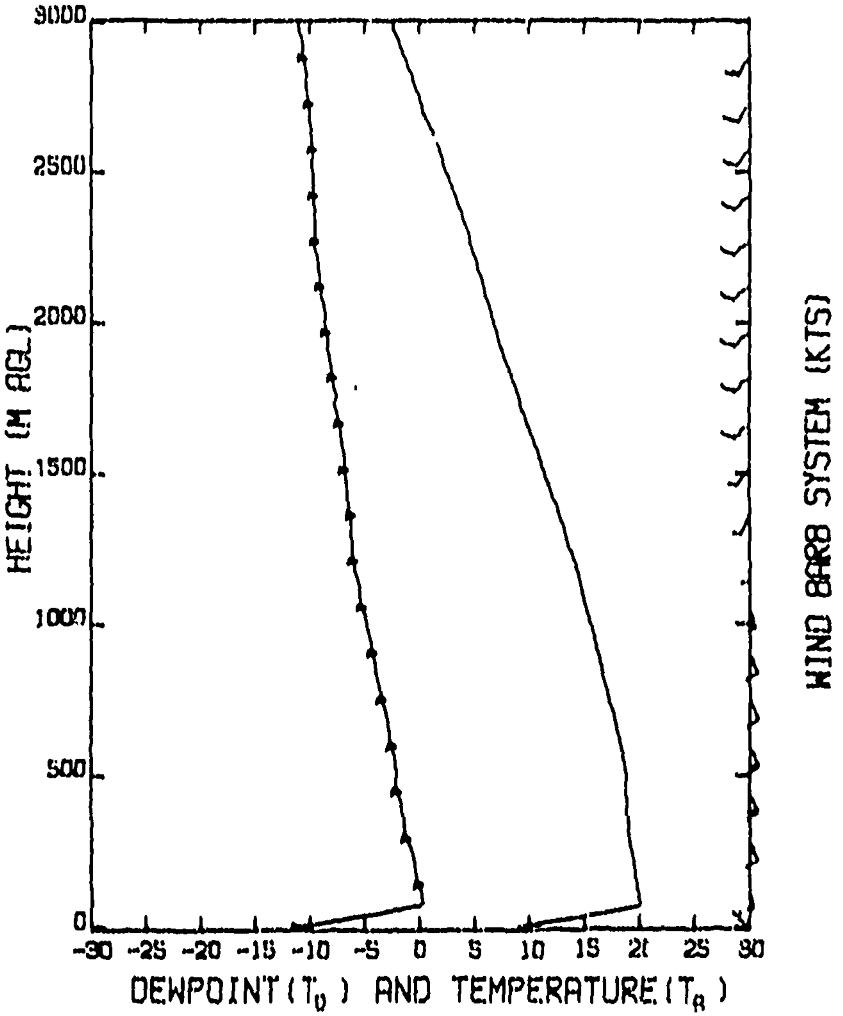


TABLE 94
APACHE SITE RAWINSONDE DATA

DATE: 08 APR 77 RELEASE NO.: 57 RELEASE TIME: 2359 MST

SIGNIFICANT AND MANDATORY LEVELS

GEOMETRIC ALTITUDE (M AGL)	PRES (TORR)	TEMP (C)	VAPOR PRES (TORR)	WIND DIR (DEG)	WIND SPEED (M/S)
0.0	662.0	9.0	1.9	310.0	1.0
72.1	656.4	20.0	4.8	199.0	0.5
323.4	637.5	18.9	4.1	158.0	4.6
550.4	620.8	18.6	3.9	156.0	7.2
1203.8	574.9	14.1	2.9	182.0	2.6
1961.5	525.0	7.0	2.4	225.0	4.6
2298.4	503.8	4.4	2.2	226.0	4.6
3197.5	450.4	-4.5	1.9	220.7	9.1



APPENDIX A

AIRCRAFT MEASUREMENTS OF THE ATMOSPHERIC STRUCTURE PARAMETER

Aircraft measurements of the atmospheric structure parameter measure of optical turbulence were performed by the Wave Propagation Laboratory, Environmental Research Laboratories, National Oceanic and Atmospheric Administration. The report covering these measurements is included as Appendix A.

Temperature irregularities may be noted where the ambient temperature is within 1° of 0°C. This is an instrumental effect (related to the tape recorder) and should be overlooked.

NOAA Technical Memorandum ERL WPL-27

WSMR ATMOSPHERIC STRUCTURE CONSTANT (C_n^2) SURVEY

R. B. Fritz
R. S. Lawrence

This report was supported in part by the
US Army Electronics Command, Atmospheric Sciences Laboratory,
White Sands, NM 88002, under W43P6S 77-8029
Mr. G. Hoidale was the ASL-WSMR Technical Representative.

Wave Propagation Laboratory
Boulder, Colorado
September 1977

WSMR ATMOSPHERIC STRUCTURE CONSTANT (C_n^2) SURVEY

R. B. Fritz and R. S. Lawrence

1. INTRODUCTION

Between March 25 and April 5, 1977, a multi-sensor cooperative atmospheric survey was carried out at White Sands Missile Range, New Mexico. The Atmospheric Sciences Laboratory of WSMR conducted ground-based and rawinsonde measurements of the refractive index structure constant C_n^2 (at heights of 8 and 32 meters on two meteorological towers), wind, temperature, humidity, and pressure. The Optical Propagation Group of the NOAA/ERL Wave Propagation Laboratory (Boulder, Colorado) carried out measurements of C_n^2 using an aircraft-mounted temperature probe, including vertical profiles to 3000 meters above ground and constant altitude circuit surveys. The aircraft measurements and concurrent rawinsonde launches took place at approximately local midnight, dawn, noon, and sunset. This report describes and summarizes the aircraft measurements only.

The area surveyed is between Alamogordo and Las Cruces, New Mexico, and is illustrated in the accompanying map (Fig.1). The terrain is relatively flat with a mean altitude of approximately 1200 meters above sea level. The north-south ridge of the San Andres mountains, at an altitude of 2100-2400 meters, is 15 kilometers west of the center of the area. 32-meter meteorological towers are located at the sites denoted Apache and LSTC, which are 5.5 km apart. At the northern corner of the area is the dry lake, Lake Lucero, and the beginning of the White Sands National Monument.

2. AIRCRAFT MEASUREMENTS

The objective of the aircraft measurements was to obtain vertical profiles and constant altitude surveys of the optical refractive index structure constant, C_n^2. This parameter is derived from the

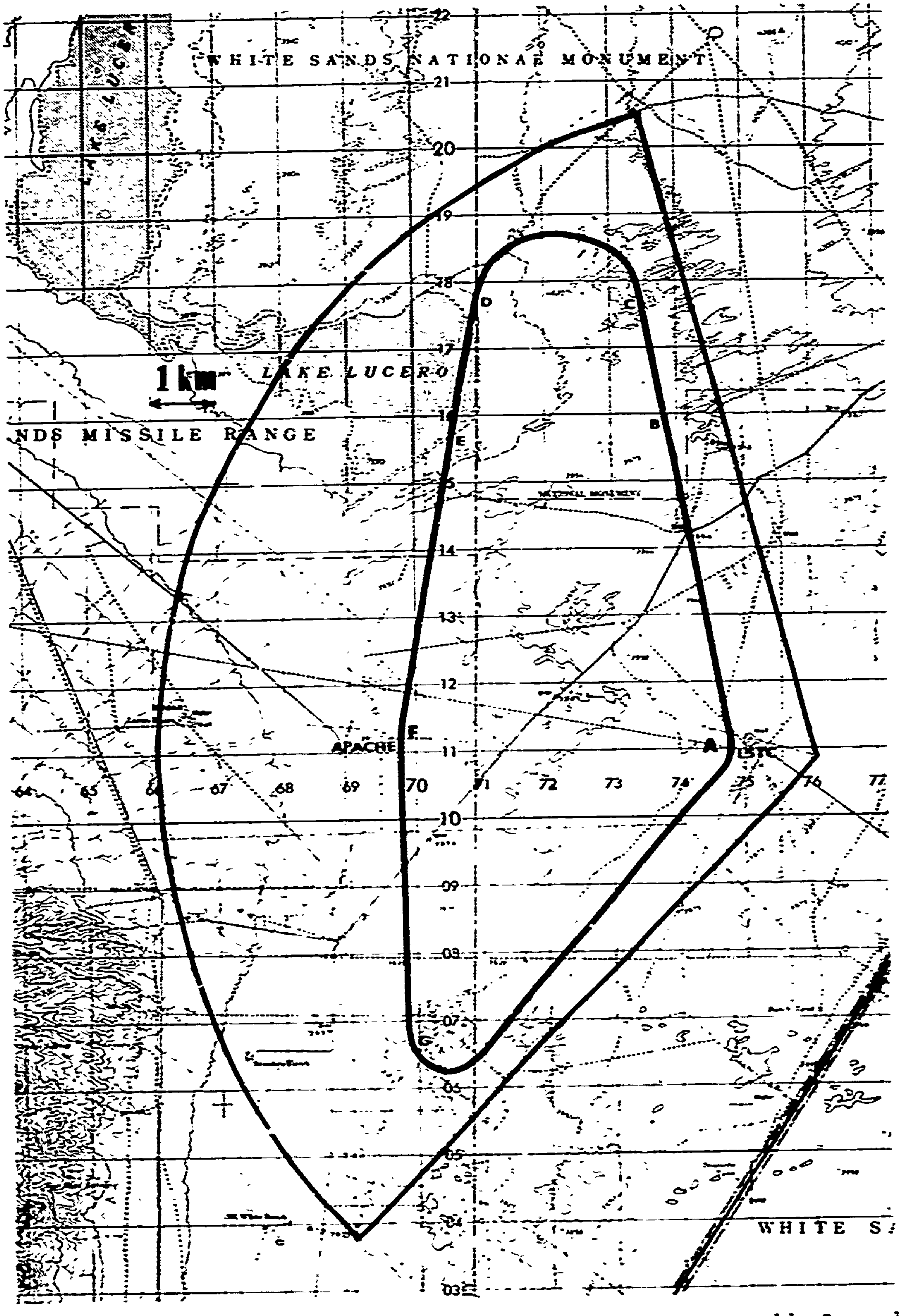


Figure 1. Map of surveyed area (Map courtesy of U.S.Army Topographic Command).

temperature structure parameter, C_T^2, through the relation:

$$C_n^2 = \left(\frac{79\ P}{T^2}\right)^2 10^{-12}\ C_T^2 \tag{1}$$

where P is pressure in millibars and T is the absolute temperature. Units of C_n^2 and C_T^2 are $m^{-2/3}$.

Equation 1 is based on the assumption that over small scale sizes, temperature rather than humidity fluctuations affect the refractive index structure. In turn, C_T^2 is determined from a temperature sensor mounted on the right wing of a Cessna 205, about 3 meters from the engine. The sensor consists of a 6 µm platinum wire wound on an open square, .35 cm on a side and 2 cm long in the direction of flight. The sensor and its mounting are shown in Fig. 2 and Fig. 3. Sensor resistance fluctuations can be related to corresponding temperature fluctuations, and by assuming that the spectrum of turbulence follows the Kolmogorov Law, it can be shown that:

$$C_T^2 = \frac{2.68\ (\overline{T}^2 - \overline{N}^2)}{\left(\frac{v}{2\pi\ f_L}\right)^{2/3} - \left(\frac{v}{2\pi\ f_H}\right)^{2/3}} \tag{2}$$

where $\overline{T}^2$ is the mean square temperature fluctuation,

$\overline{N}^2$ is the mean square aircraft and system noise fluctuation,

v is aircraft air speed,

f_L is the low frequency response limit (0.23 Hz), and

f_H is the high frequency response limit (320 Hz).

Derivation and discussion of these equations are available in the reference by Lawrence *et al.* (1970). The use of this system in previous surveys is described by Ochs and Lawrence (1972) and Ochs *et al.* (1976).

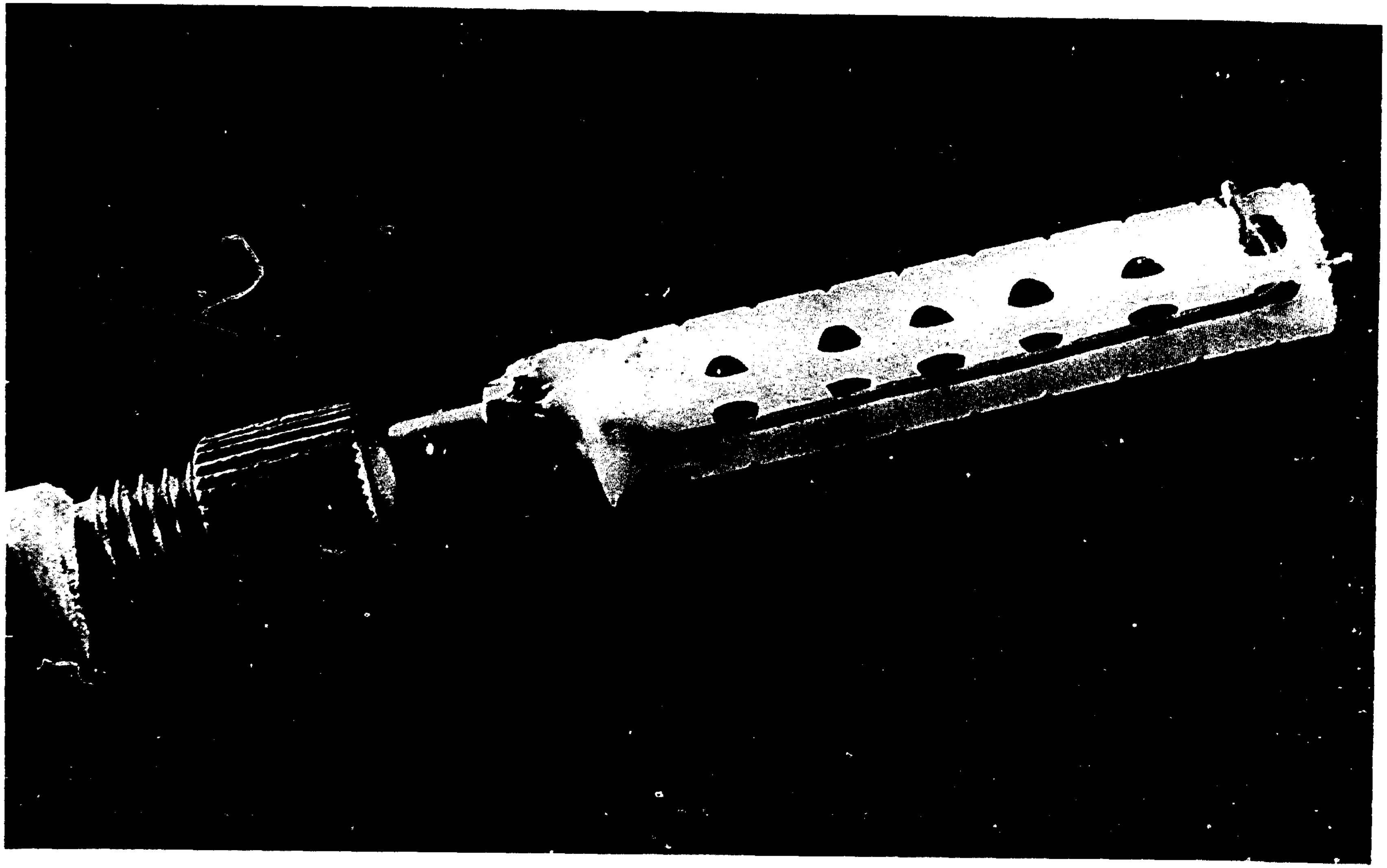


Figure 2. The C_T^2 probe consisting of a 6 µm platinum wire wound on a form 2 cm in length.

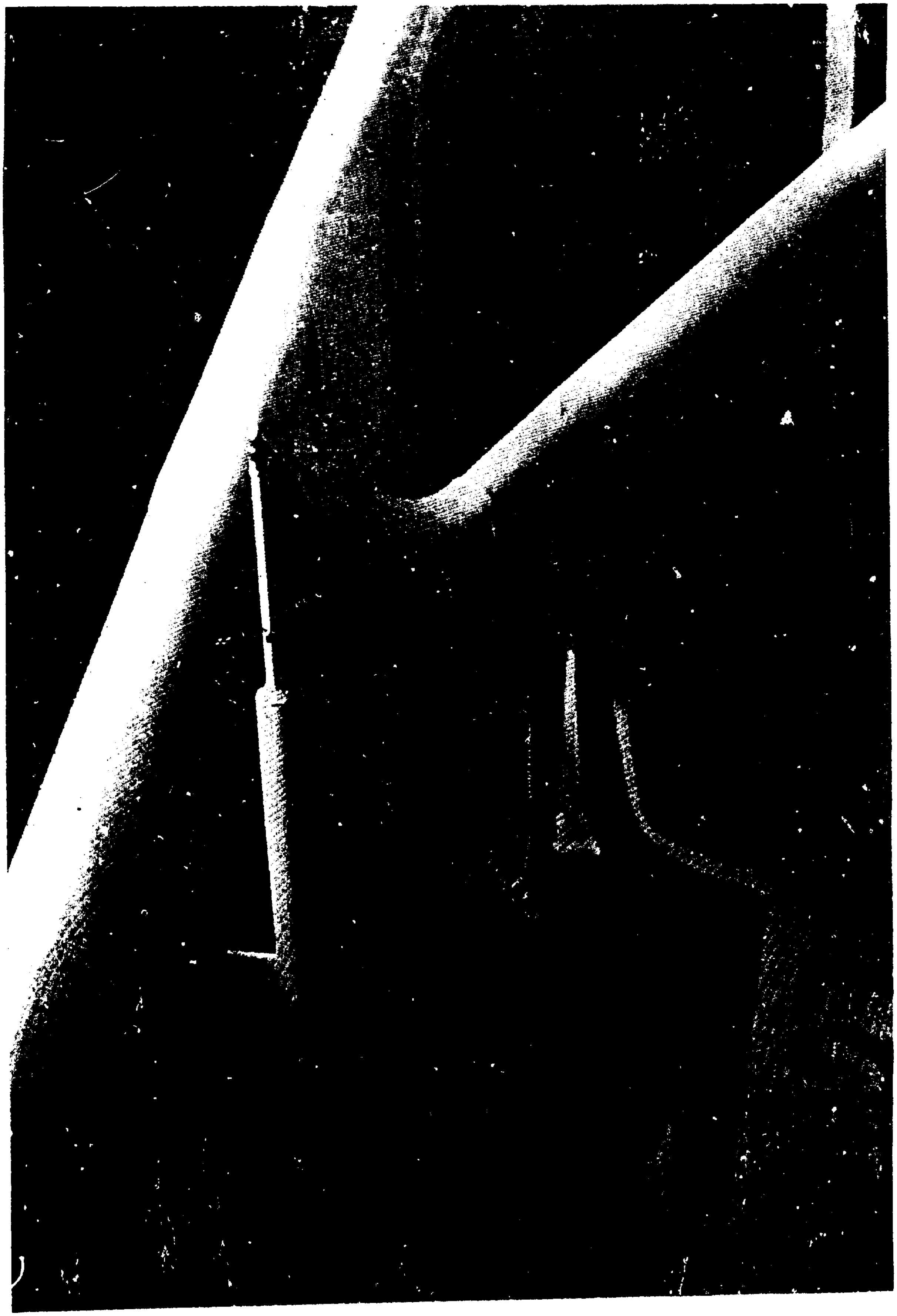


Figure 3. Mounting of the C_T^2 probe on the Cessna 205

The system was calibrated on the ground with the sensor covered and the aircraft motor off to minimize all fluctuations, and again in the air before beginning the surveys. Corrections to account for temperature dependence of calibration were derived by G. R. Ochs and D. Walters.

In addition to the temperature fluctuation data, temperature itself was simultaneously recorded on the airborne tape recorder. Altitude, pressure, air speed, and other information were recorded verbally on the same recorder.

3. DATA REDUCTION

Data were recorded on an instrumentation tape recorder on board the Cessna and subsequently digitized at 5 second intervals. The digitized data were edited to add related information such as altitude, location, air speed, etc., and to remove erroneous data caused by voice information over-riding the temperature channel or aircraft radio interference on the C_n^2 channel.

3.1 Vertical Profile Data

To obtain data for the vertical profiles, the Cessna was flown in a descending spiral from 3 km above ground. Air speed was approximately 50 meters per second and the descent rate was 2½ meters per second. The temperature and C_n^2 data were processed by averaging all points within a 75 meter altitude range and representing that interval by one point in the vertical profile plots.

3.2 Constant Altitude Circuit Flights

The circuit flights at 61, 122, and 244 meters above ground could have started at any point on the path indicated on the map (Fig. 1), and the ground speed on any leg would differ from one run to another depending on winds speeds and directions. In order to present a consistent representation of these surveys, the data are "normalized" to show LSTC at the start and end of each graph, with passage of Apache site at 60% of the way around. In practice, Apache was within 5% of this fractional flight time. The "checkpoints" around the circuit are noted on the map and on the graphs as follows:

A: LSTC site
B: South edge of drifted white sand (more distinct than indicated on map)
C: North edge of drifted white sand
D: North edge of Lake Lucero
E: South edge of Lake Lucero
F: Apache site
G: South end turn

On many graphs, not all checkpoints are noted, but their approximate locations can be estimated easily.

4. FLIGHT SCHEDULES

Flights were scheduled within the two-hour time frames centered at 0000, 0500, 1200, and 1800 MST starting with the 0500 flight on March 25th and ending with the 0000 flight on April 5th. Two pilot/data recorder teams permitted operating around the clock.

The usual flight program consisted of the spiral descent from 3000 meters above ground to near the ground followed by constant altitude circuits of the area, at altitudes corresponding to 61, 122, and 244 meters above the ground. The 61-meter circuits were generally omitted on the midnight flights. The path of the counter-clockwise circuit flights is shown on the map (Fig. 1).

On a number of occasions, weather conditions or equipment problems prevented making the complete set of measurements described above. The times of several flights were altered to meet range air space scheduling requirements.

WHITE SANDS C_n^2 SURVEY

Summary of Flight Schedules and Data Obtained

Flight number	Date 1977 Mar-Apr	Time MST	Descent phase	Level flight phases	Notes (reasons for lost data)
1	25	0500	Y	Y[1]	
2	25	1000		Y	Tape recorder problem at start
3	25	1800	Y	Y	
4	26	0000	Y	Y	
5	26	0500			Sensor broken in flight
6	26	1200	Y	Y	Sensor replaced; vertical profile data from ascending run
7	26	1800			Thunderstorm
8	27	0000	Y	Y	
9	27	0500	Y	Y	
10	27	1200			Sensor broken in flight
11	27	1800			Poor weather - overcast with showers
12	28	0000			Tower instruments out (blowing sand)
13	28	0500			" " " " "
14	28	1200			Temperature data erratic
15	28	1800	Y	Y	
16	29	0000	Y	Y	
17	29	0500	Y	Y	
18	29	1200	Y	Y	
19	29	1800	Y	Y	
20	30	0000	Y	Y	
21	30	0500	Y	Y	
22	30	1200	Y	Y	
23	30	1800	Y	Y	
24	31	0000	Y	Y	
25	31	0500	Y	Y	
26	31	1100	Y	Y	
27	31	1830	Y	Y	
28	01	0000			Recorder microphone problem
29	01	0500			" " "
30	01	1200			No flights: blowing sand at ground
31	01	1800	Y	Y	
32	02	0000	Y	Y	
33	02	0500			No voice data on tape
34	02	1200	Y	Y	
35	02	1800	Y	Y	
36	03	0000	Y	Y	
37	03	0500	Y	Y	
38	03	1200		Y	Cloud build-up over mountains
39	03	1800		Y	Rain in area, overcast
40	04	0000			No back-up flight crew
41	04	0500	Y	Y	
42	04	1200	Y	Y	
43	04	1800	Y	Y	
44	05	0000	Y	Y	

---

[1] "Y" indicates data obtained and processed

5. ACKNOWLEDGMENTS

The following individuals assisted in carrying out this experiment:

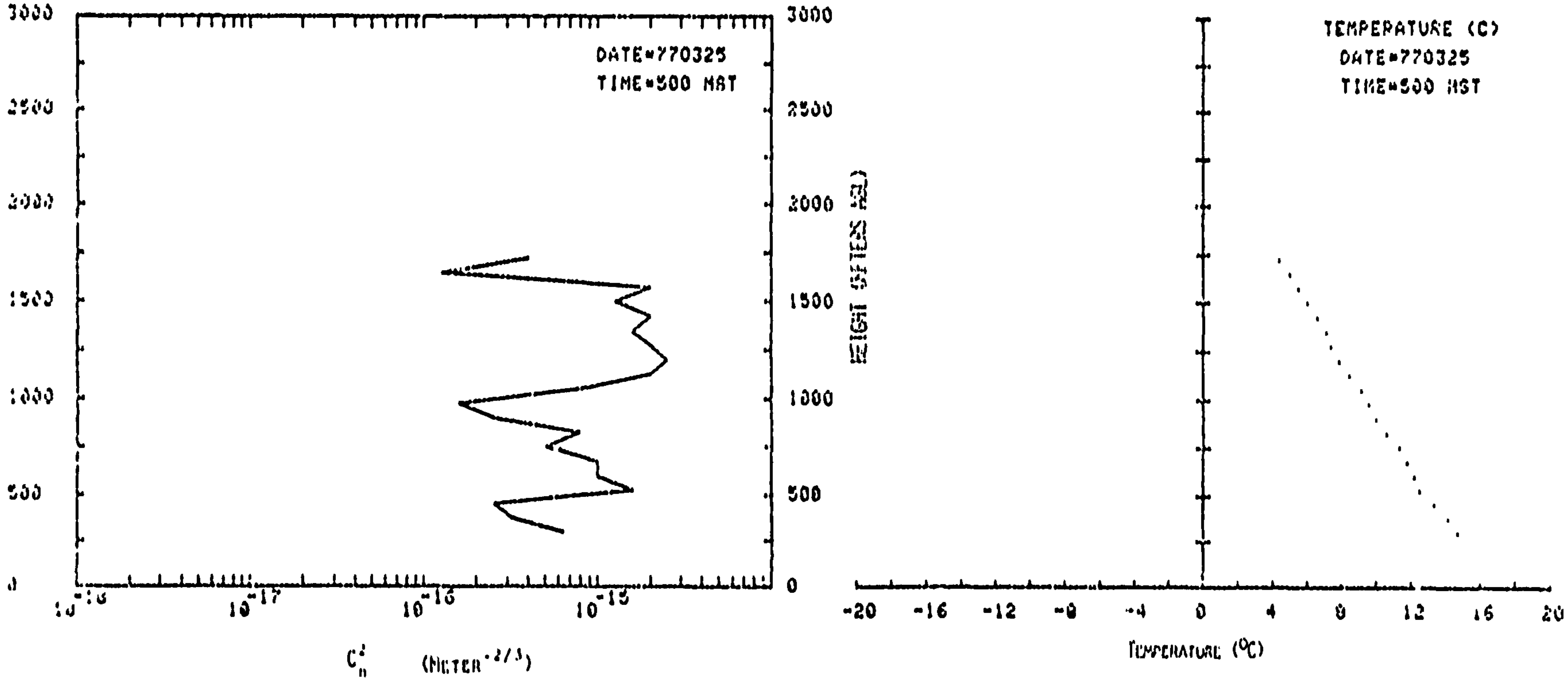
Glenn Hoidale (ASL-WSMR)	White Sands Experiment Coordinator
Colbourn Norton (ASL-WSMR)	Project Scientist
Thomas Pries (ASL-WSMR)	Project Scientist
Glen F. Miller (WPL-NOAA)	Aircraft equipment operations
Gerard Ochs (WPL-NOAA)	Project Scientist
G. T. McNice (WPL-NOAA)	Pilot
Arthur Estin (NBS-Boulder)	Pilot
Wm. Rotallack (SEL-NOAA)	Data Presentation

6. REFERENCES

Lawrence, R. S., G. R. Ochs, and S. F. Clifford (1970): Measurements of atmospheric turbulence relevant to optical propagation, *J. Opt. Soc. Am. 60*, 60:826.

Ochs, G. R., and R. S. Lawrence, (1972): Temperature and C_n^2 profiles measured over land and ocean to 3 km above the surface, NOAA Tech. Rept. ERL 251-WPL 22, Supt. of Documents, U.S. Govt. Printing Office, Washington, D. C. 20402

Ochs, G. R., Ting-i Wang, R. S. Lawrence, and P. Zlosko (1976): Stellar-scintillation measurement of the vertical profile of refractive-index turbulence in the atmosphere, *Proc. of the Soc. of Photo-Optical Inst. Engineers*, Vol. 75, (Imaging Through the Atmosphere) 48-54.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TIME=500 MST
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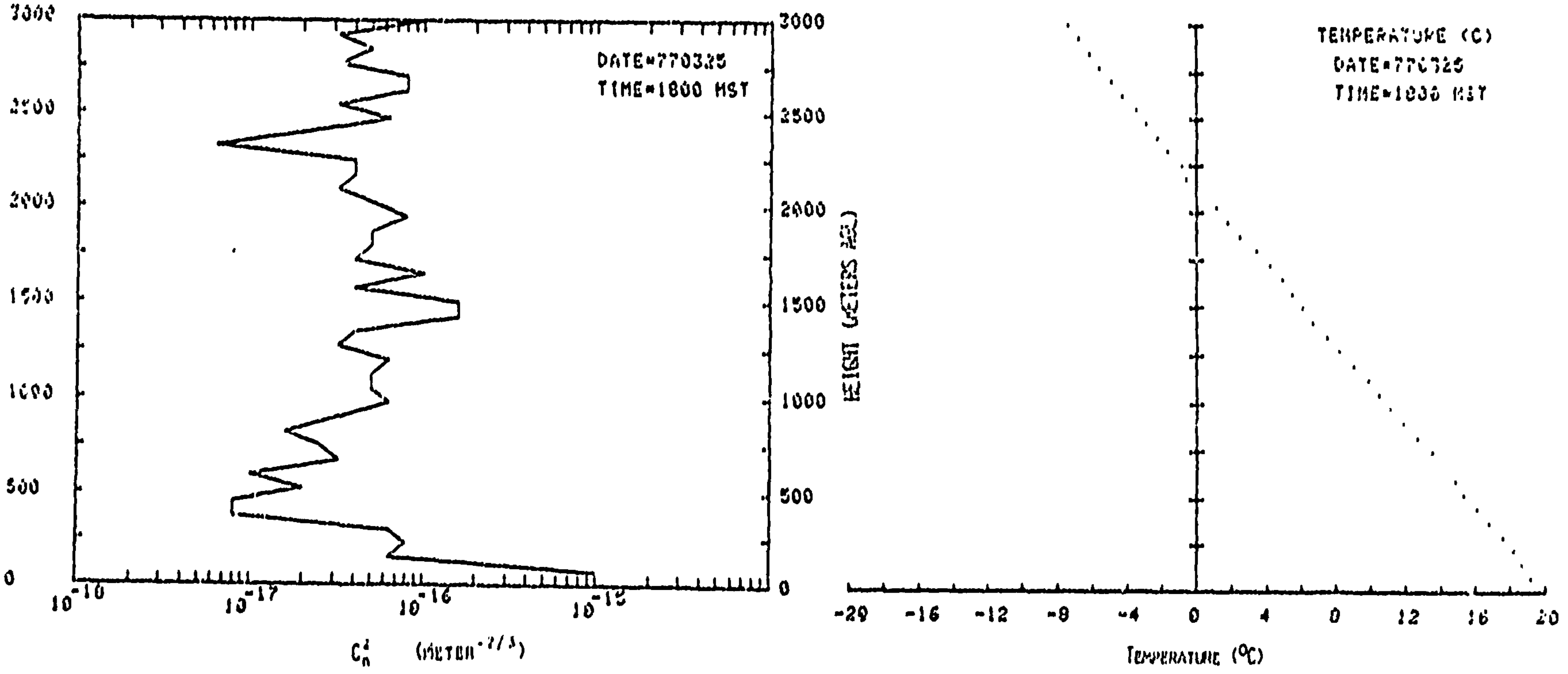
2500
2000
1500
1000
500
0
HEIGHT (METERS MSL)
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)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10^{-18}
10^{-17}
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C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
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-4
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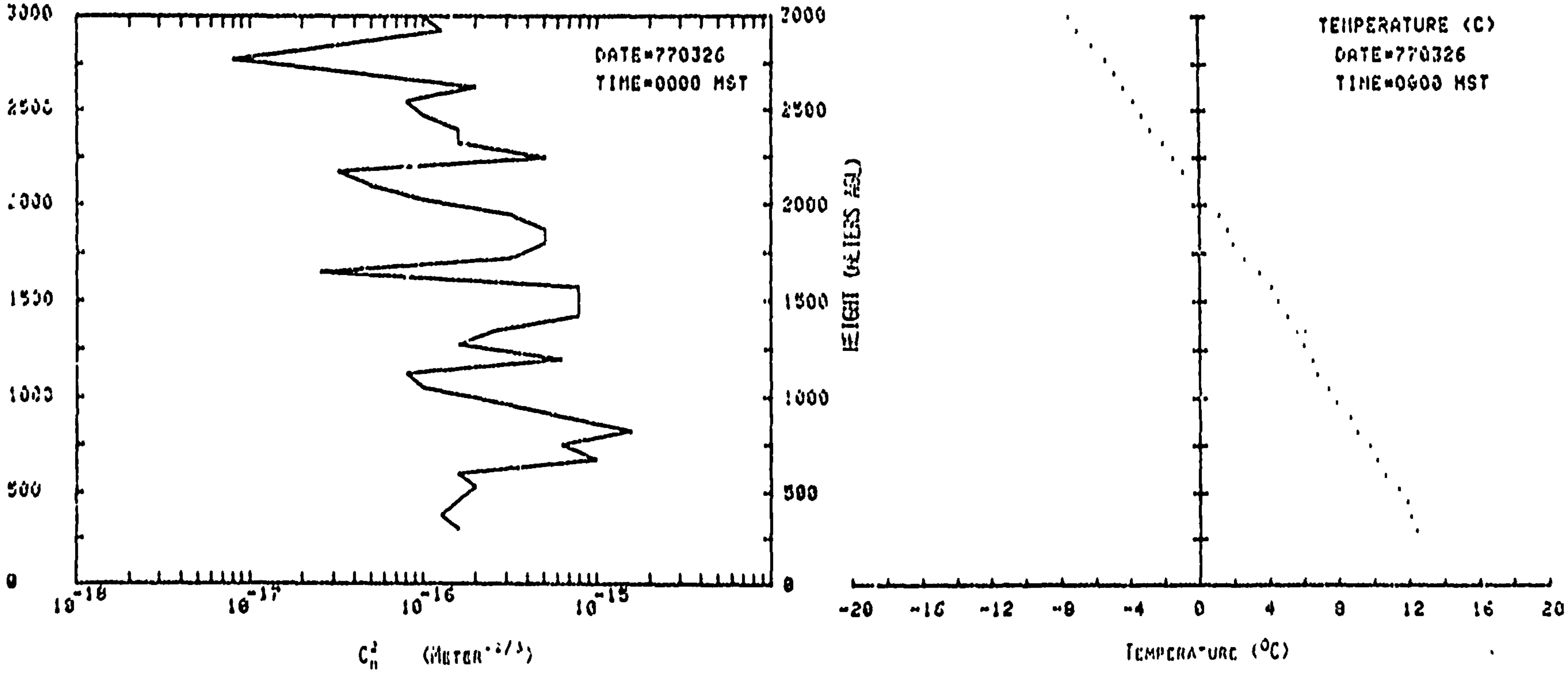
4
8
12
16
20
TEMPERATURE (°C)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2500
2000
1500
1000
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TIME=0000 MST
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
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2500
2000
1500
1000
500
0
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-4
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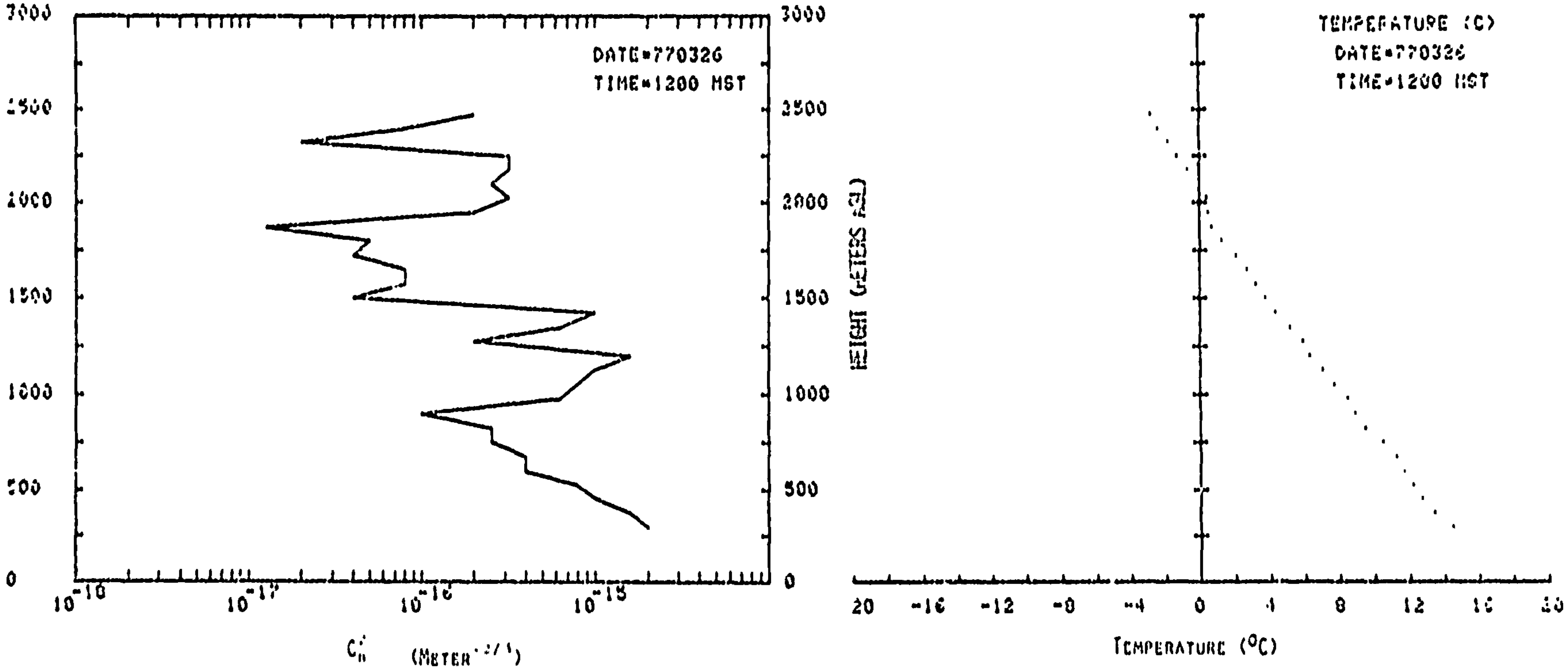
4
8
12
16
20
TEMPERATURE (°C)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2000
1500
1000
500
0
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10^{-17}
10^{-16}
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TEMPERATURE (C)
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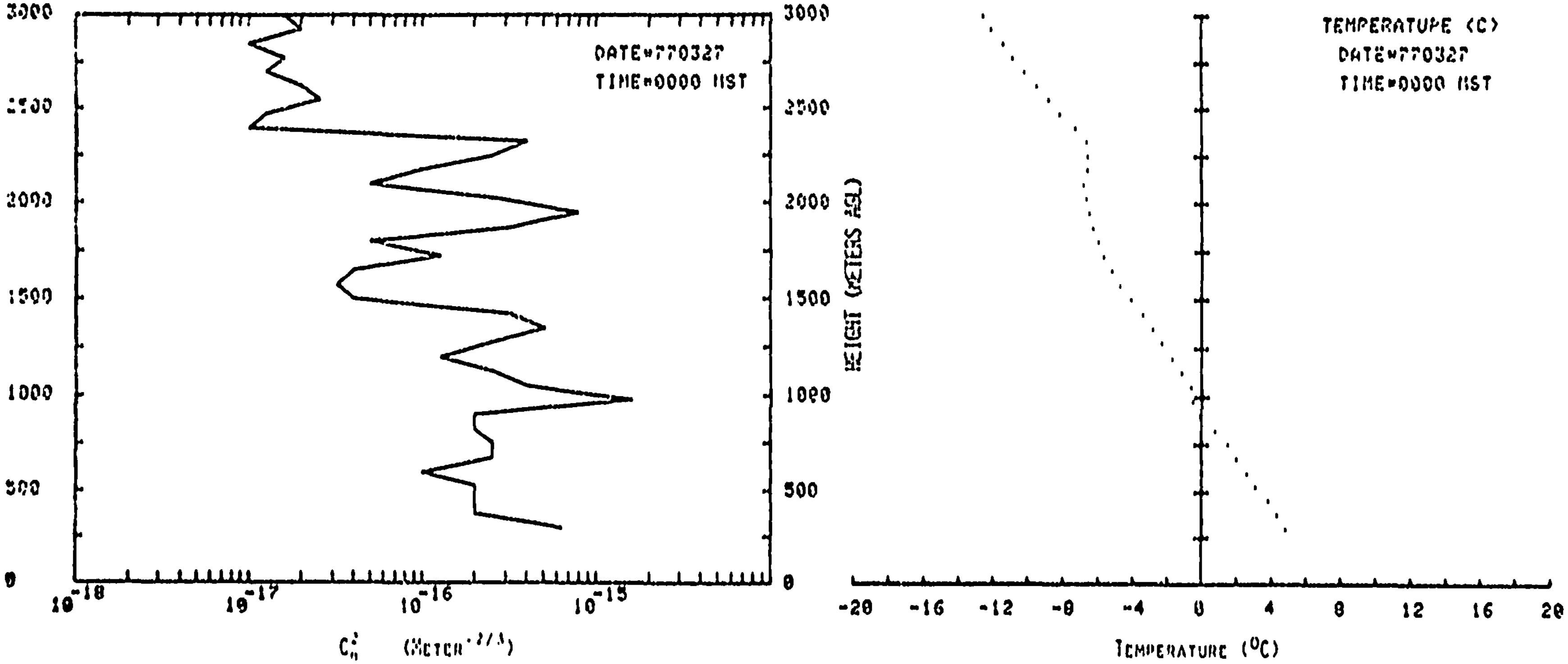
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)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TEMPERATURE (C)
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TIME=0000 MST
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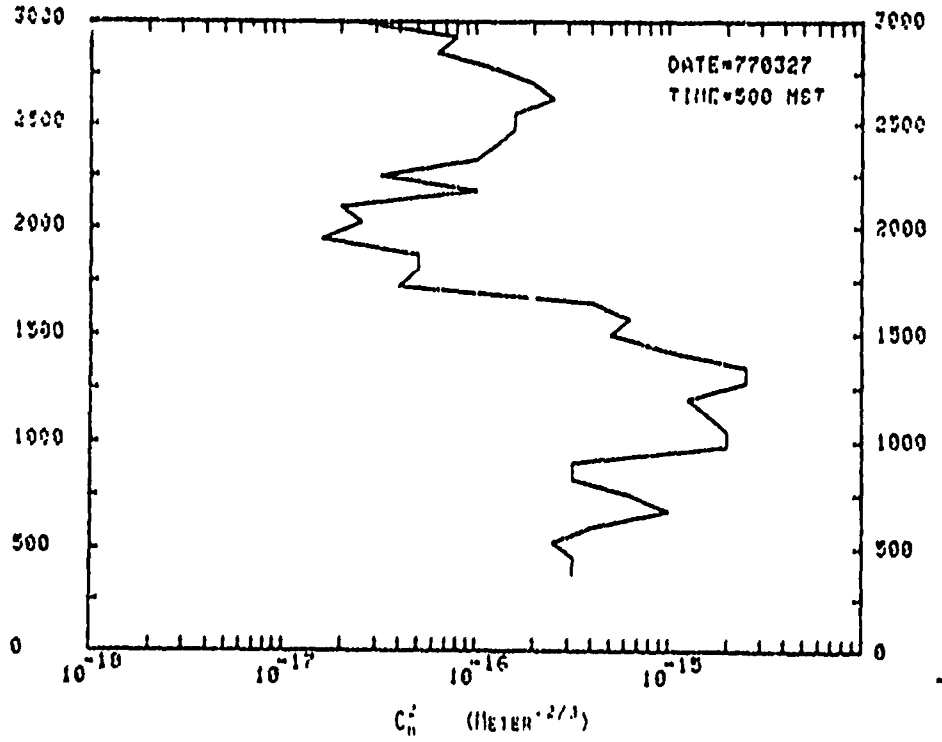
2500
2000
1500
1000
500
0
HEIGHT (METERS AGL)
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)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1000
500
0
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10^{-17}
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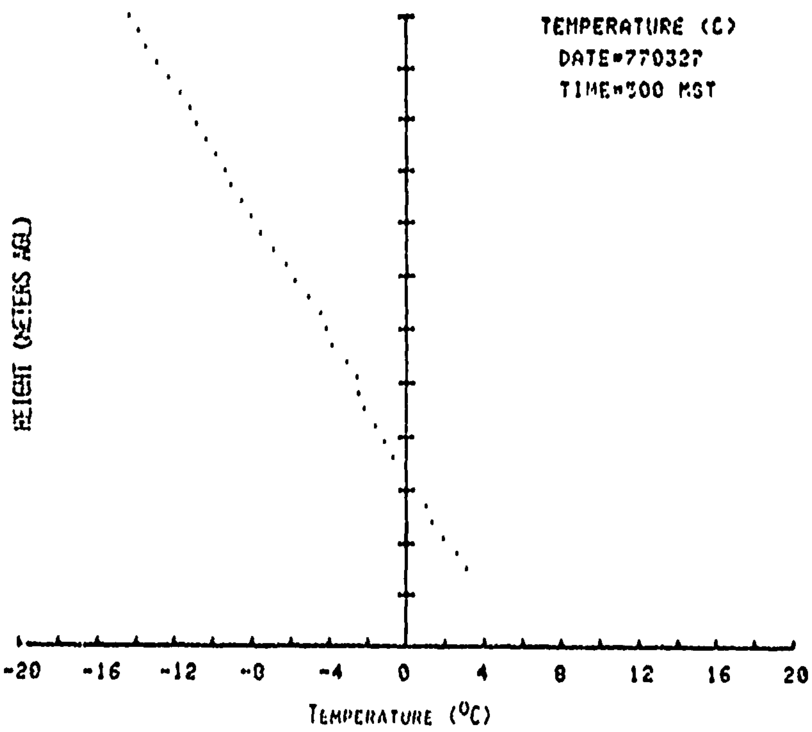
10^{-15}
C_n^2 (METER$^{-2/3}$)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2000
1500
1000
500
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-8
-4
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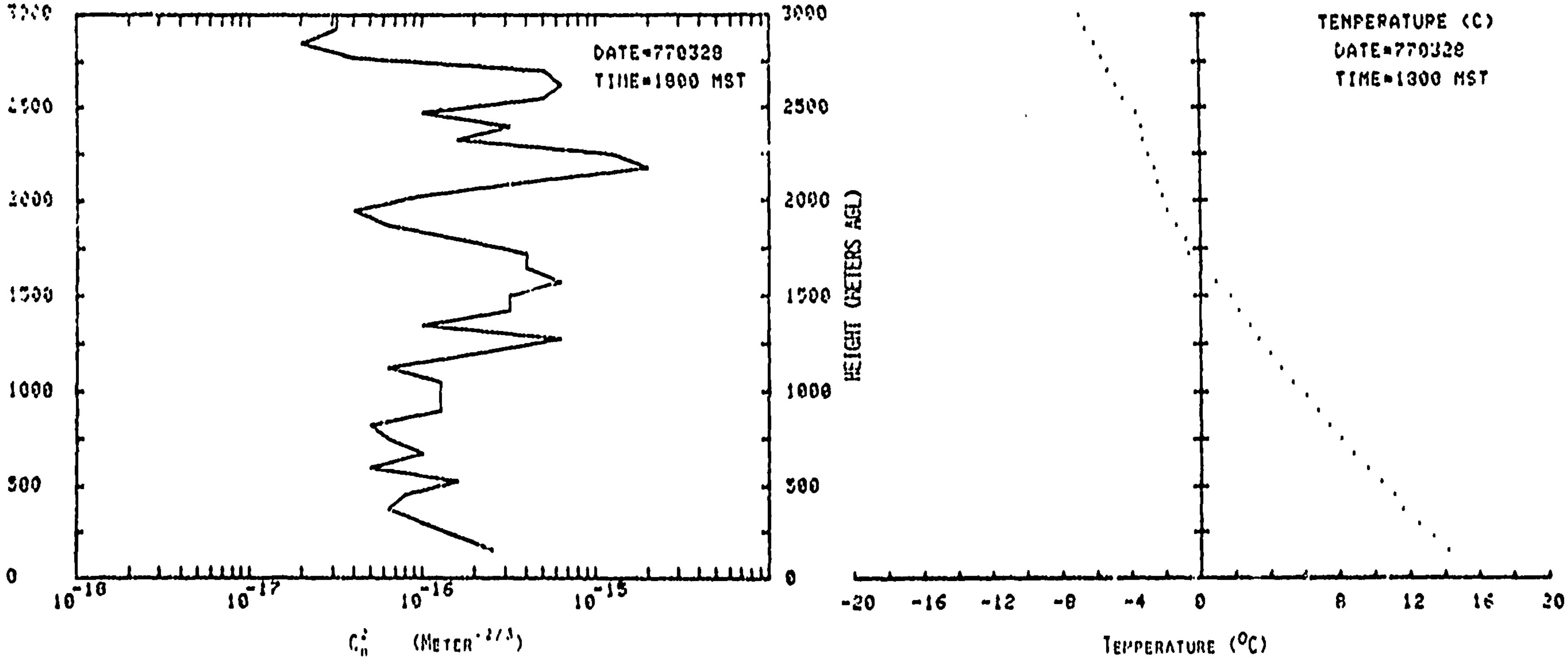
4
8
12
16
20
TEMPERATURE (°C)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2500
2000
1500
1000
500
0
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10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
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TIME=1300 MST
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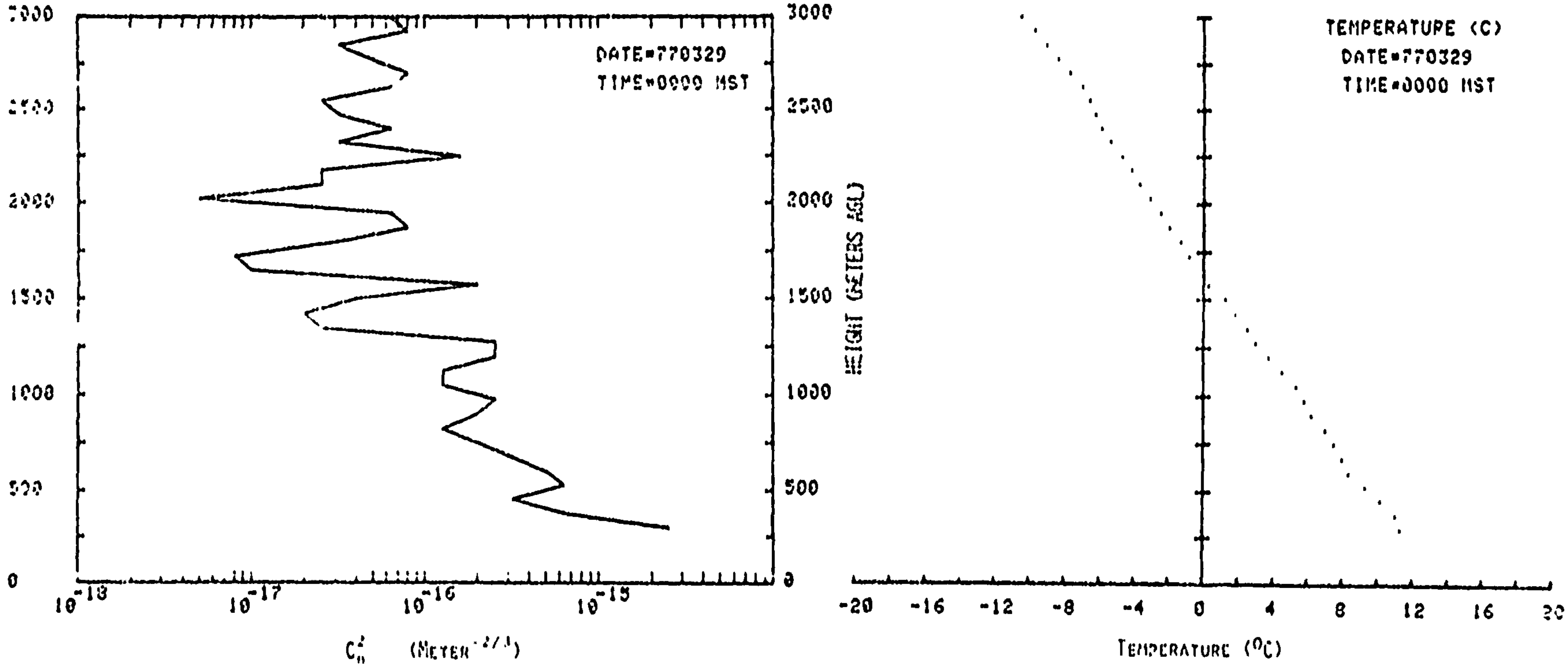
-16
-12
-8
-4
0
8
12
16
20
TEMPERATURE (°C)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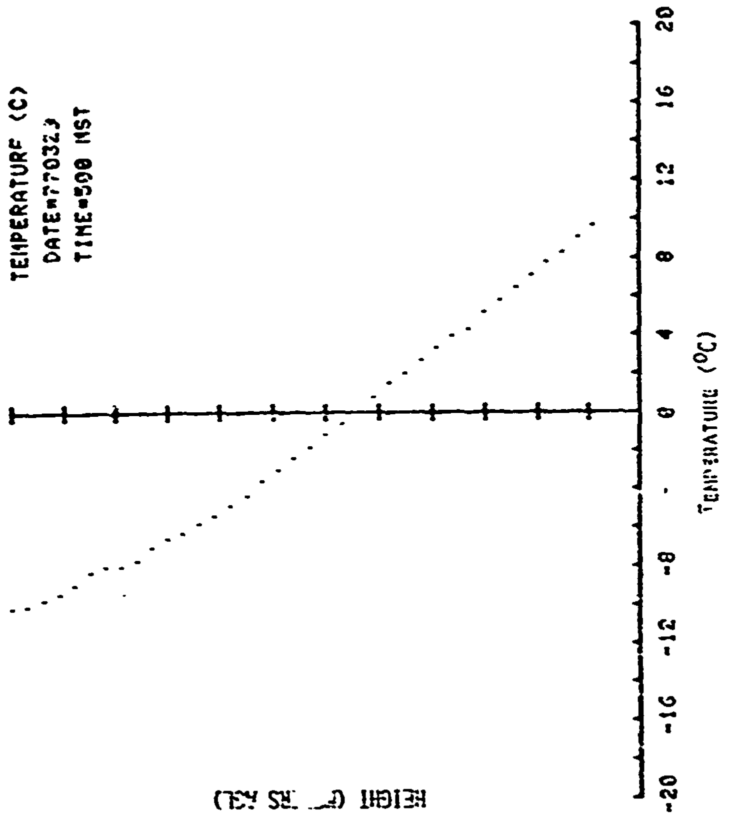
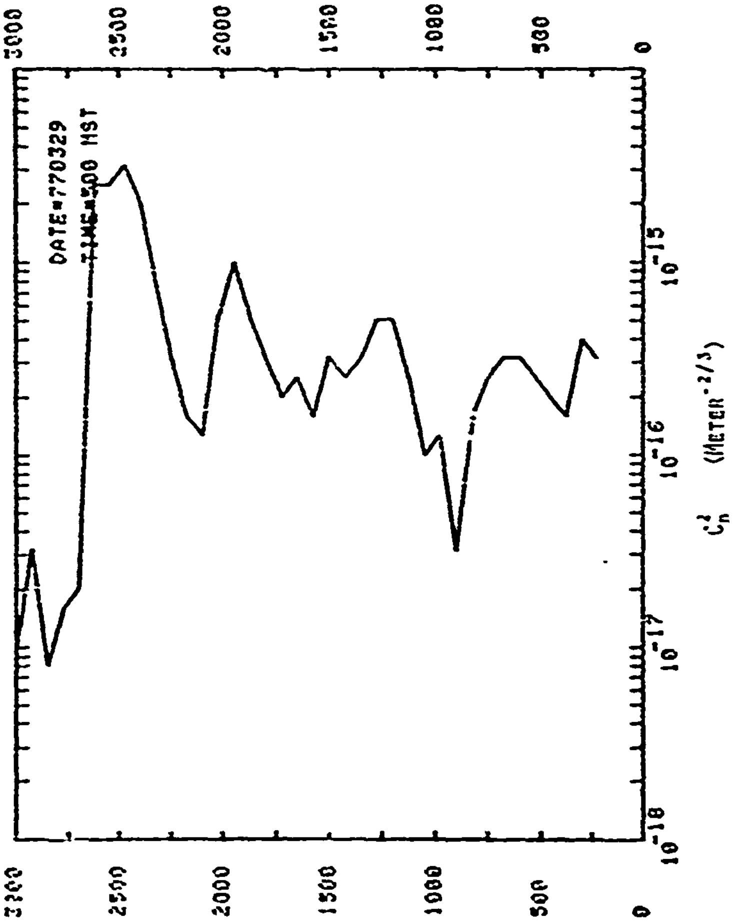
TIME=0000 MST
TEMPERATURE (C)
DATE=770329
TIME=0000 MST
3000
2500
2000
1500
1000
500
0
HEIGHT (METERS AGL)
10⁻¹⁸
10⁻¹⁷
10⁻¹⁶
10⁻¹⁵
Cn² (Meter⁻²/³)
-20
-16
-12
-8
-4
0
4
8
12
16
20
Temperature (°C)


TEMPERATURE (C)
DATE=770329
TIME=500 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)
HEIGHT (METERS ASL)


DATE=770329
TIME=500 MST
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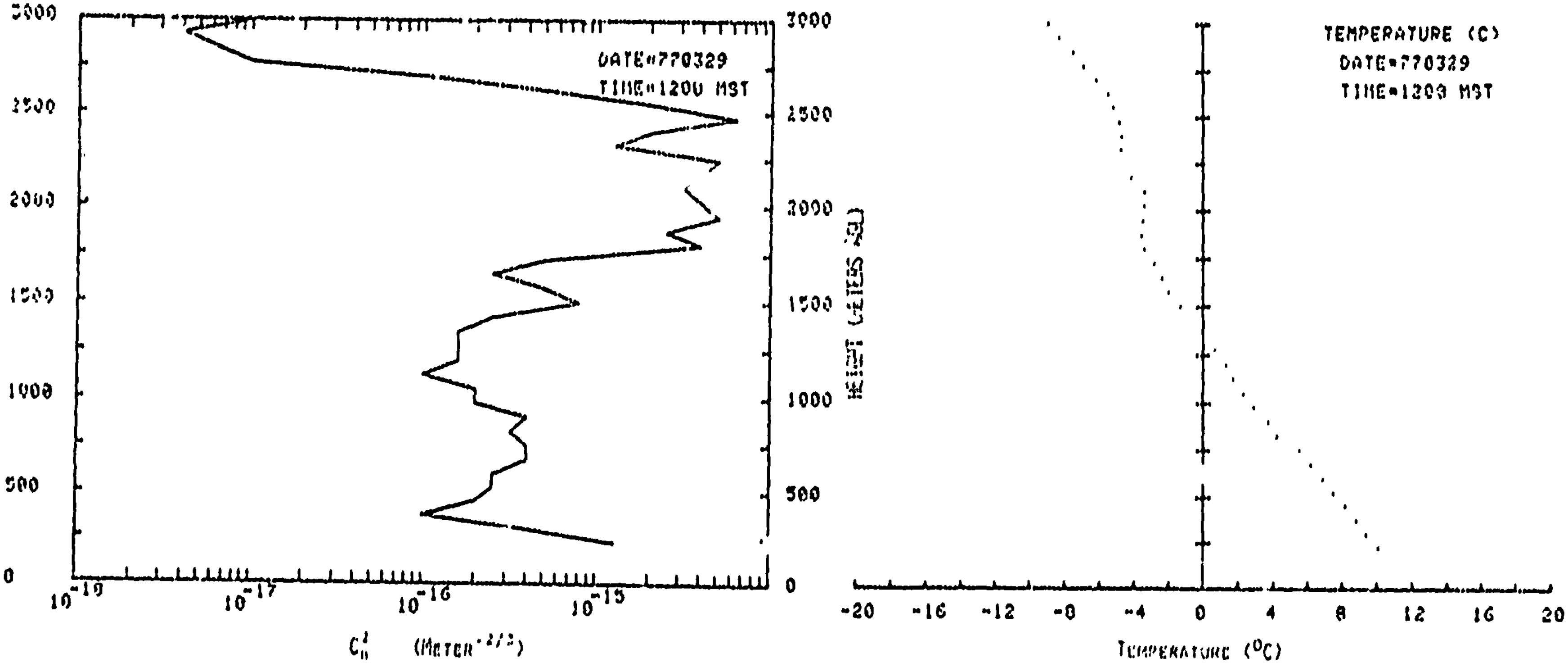
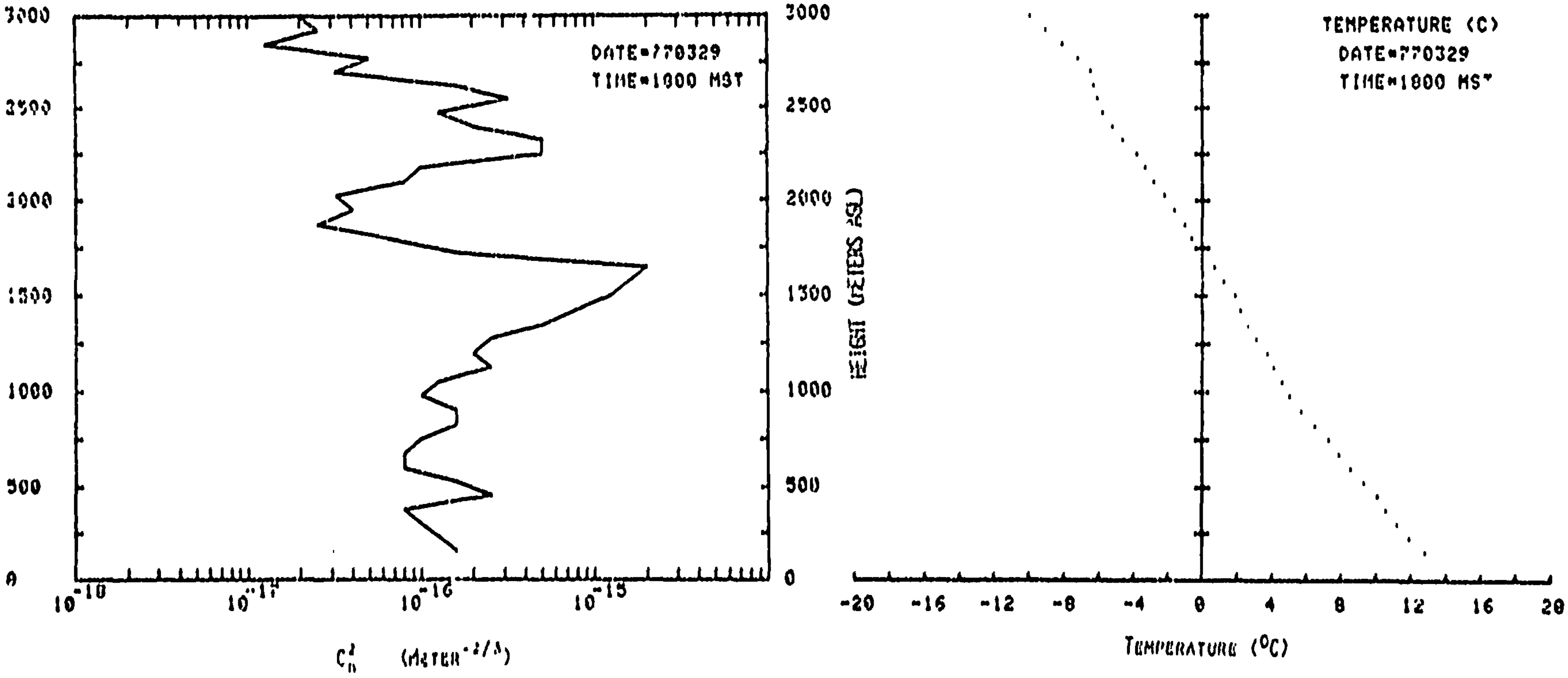
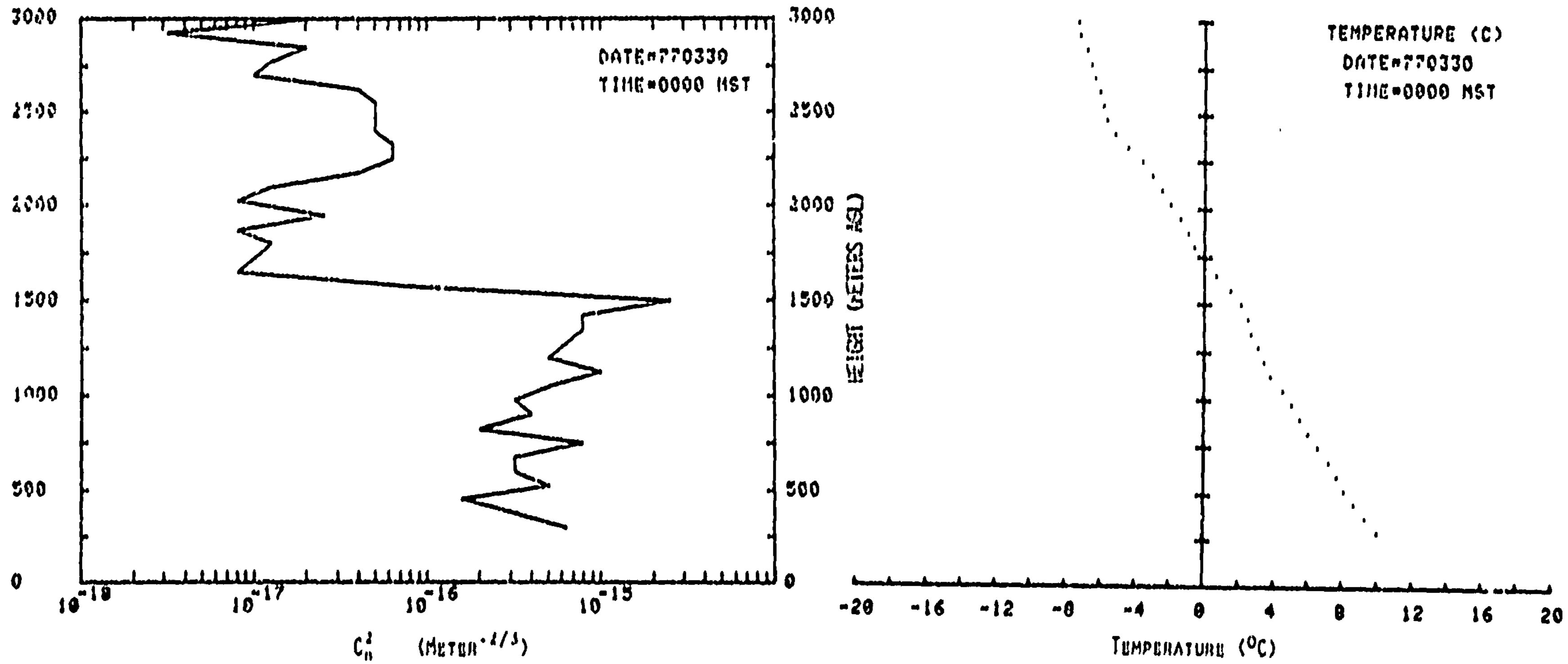
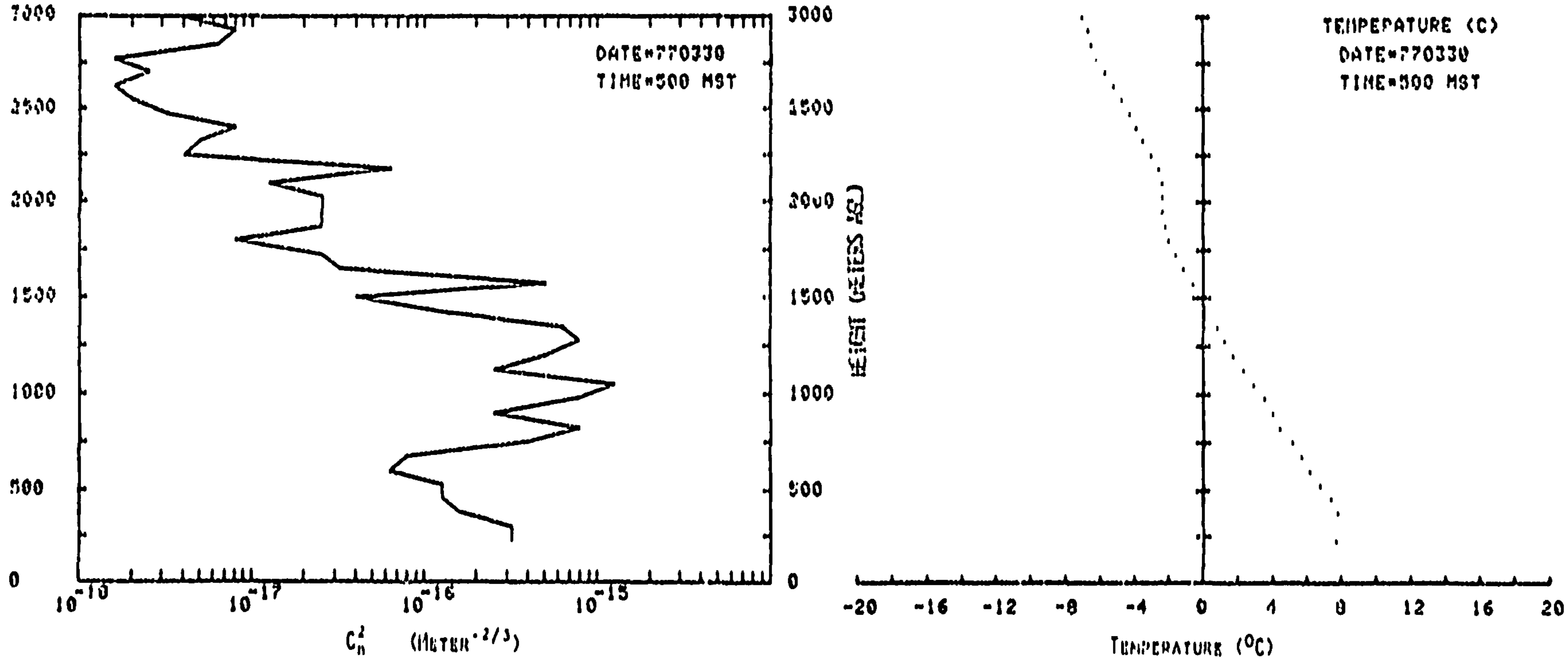
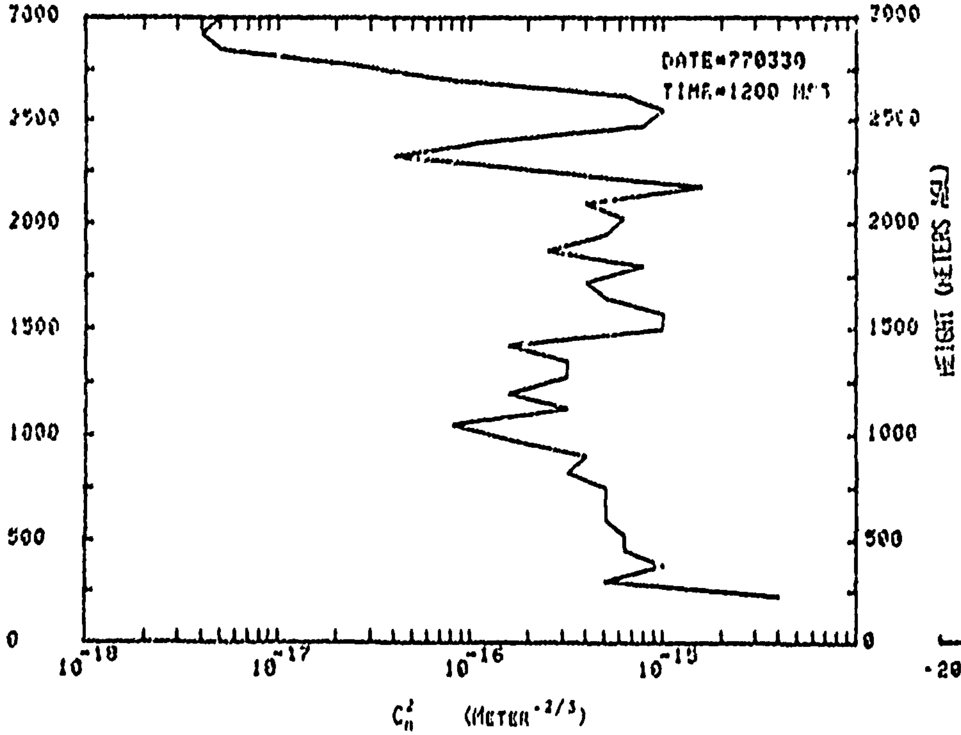
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (Meter$^{-2/3}$)

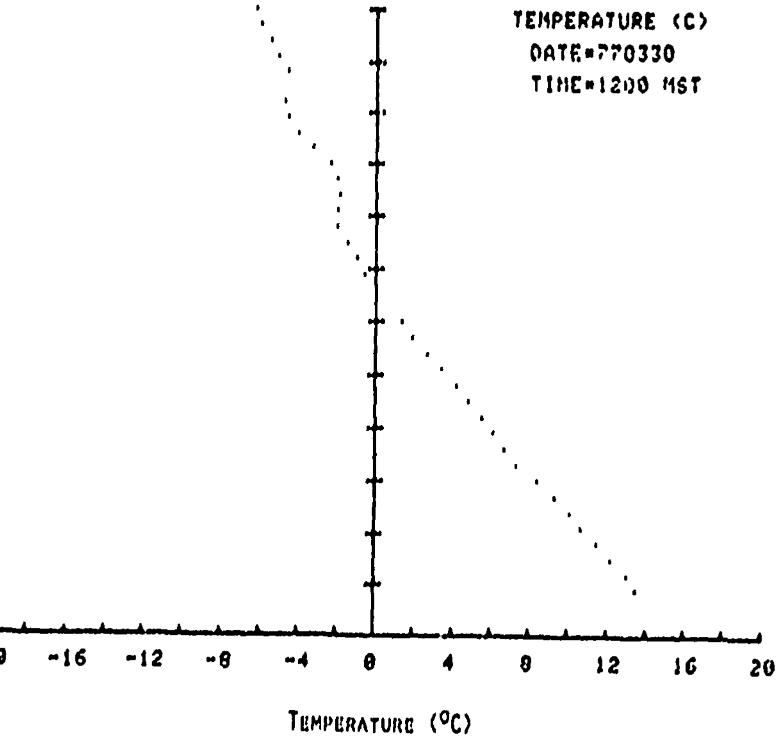

3000
2500
2000
1500
1000
500
0
DATE=770329
TIME=1200 MST
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770329
TIME=1203 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


3000
2500
2000
1500
1000
500
0
10^{-10}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
DATE=770329
TIME=1000 MST
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770329
TIME=1000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


DATE=770330
TIME=0000 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS ASL)
TEMPERATURE (C)
DATE=770330
TIME=0000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


3000
2500
2000
1500
1000
500
0
DATE=770330
TIME=500 MST
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS MSL)
TEMPERATURE (C)
DATE=770330
TIME=500 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (Meter$^{-2/3}$)
HEIGHT (METERS MSL)
DATE=770330
TIME=1200 MST


TEMPERATURE (C)
DATE=770330
TIME=1200 MST
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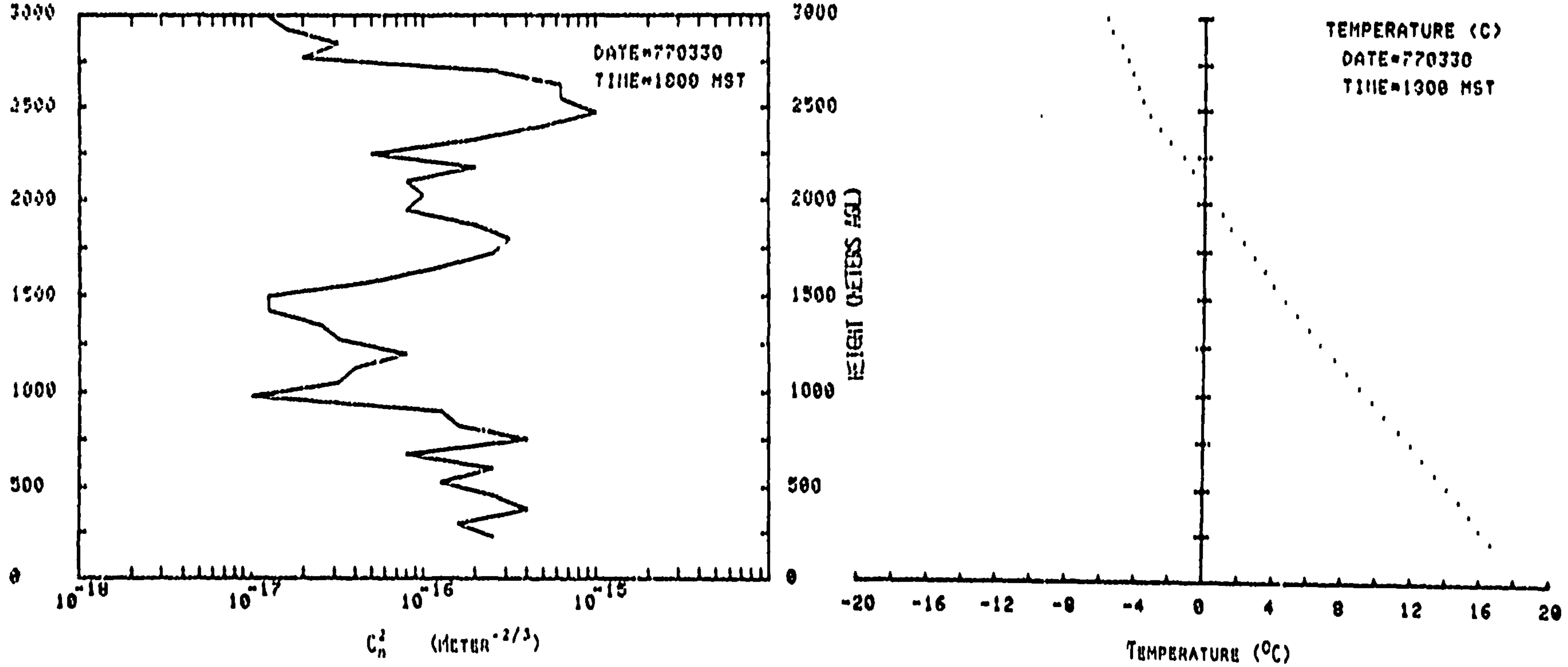
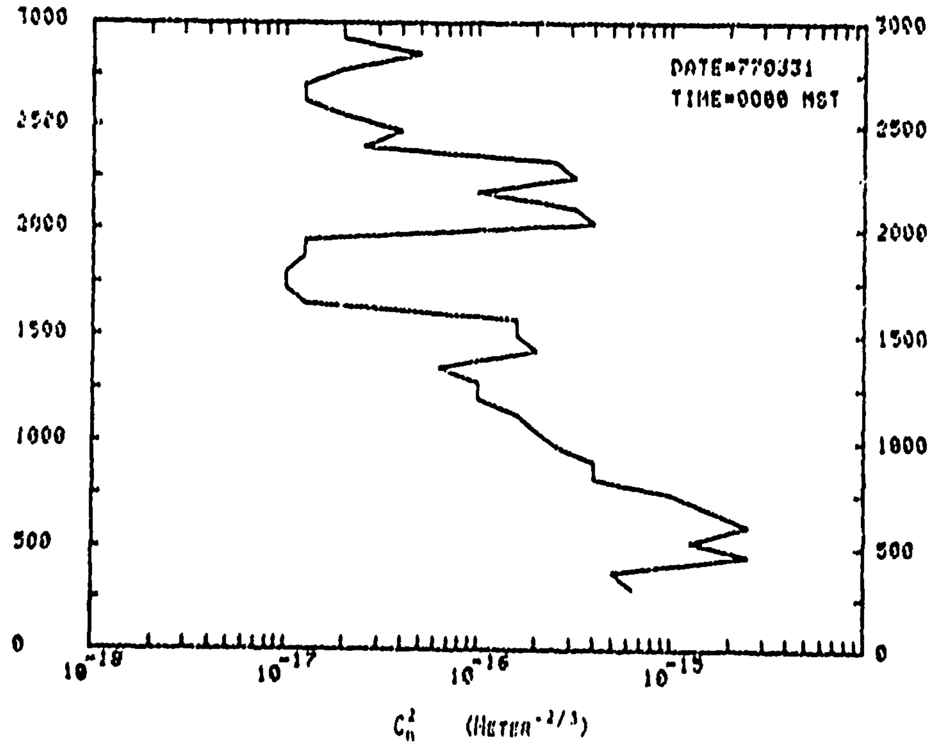
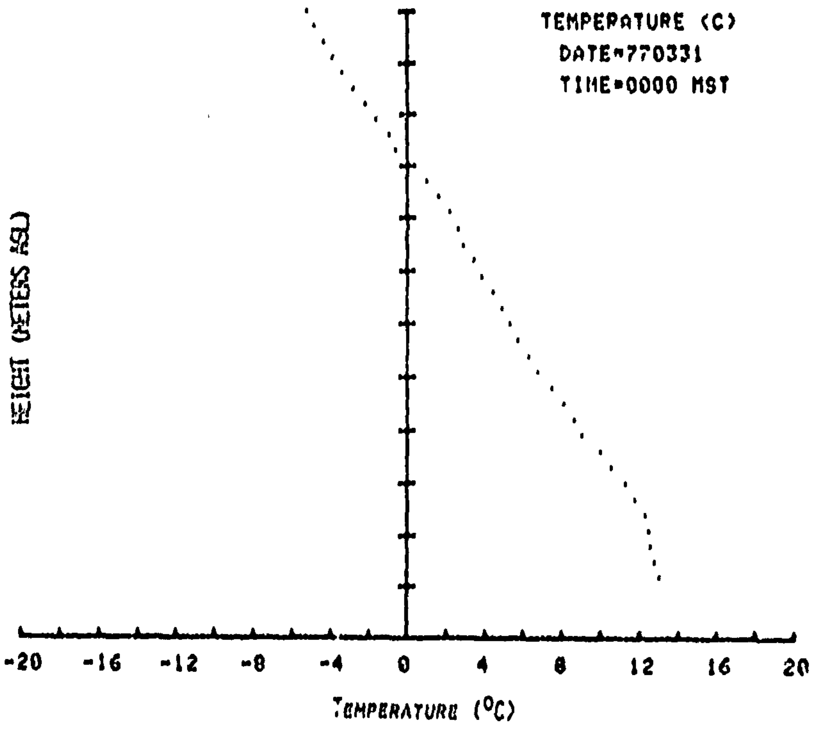
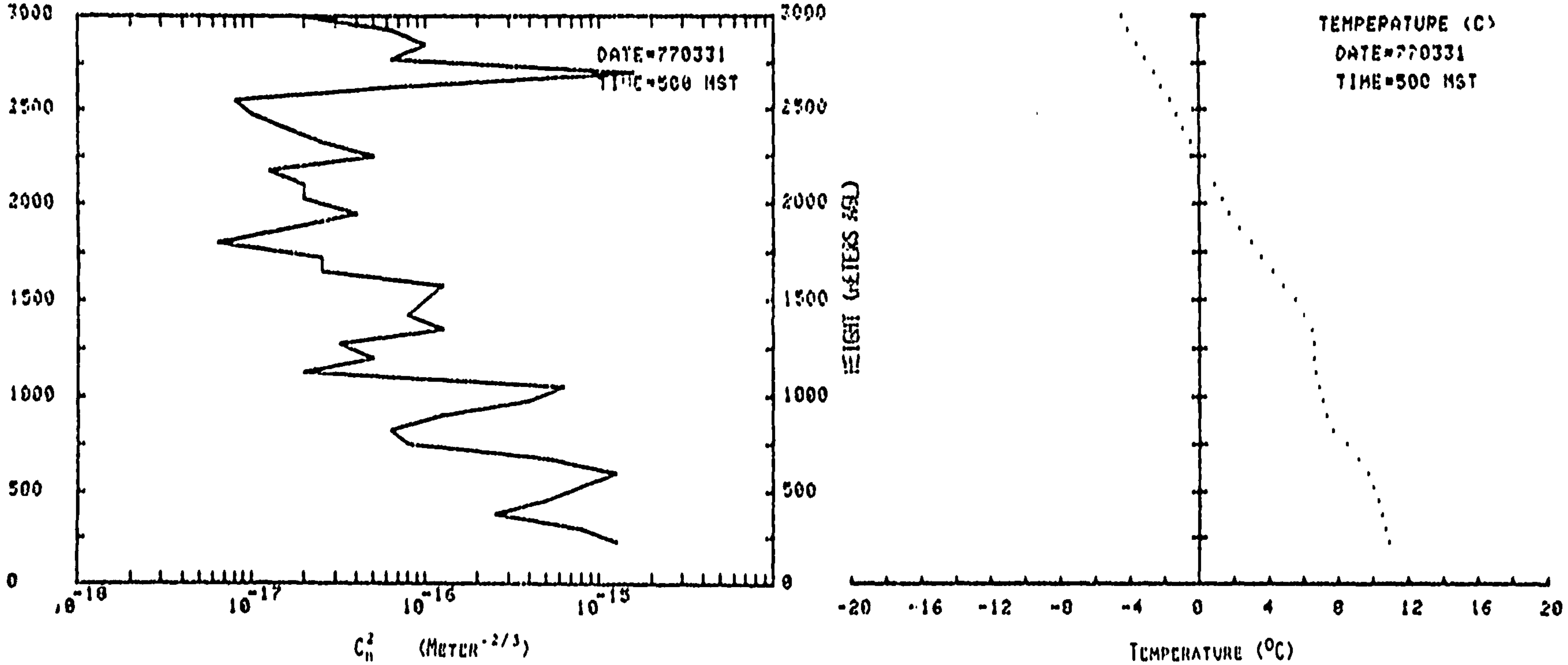
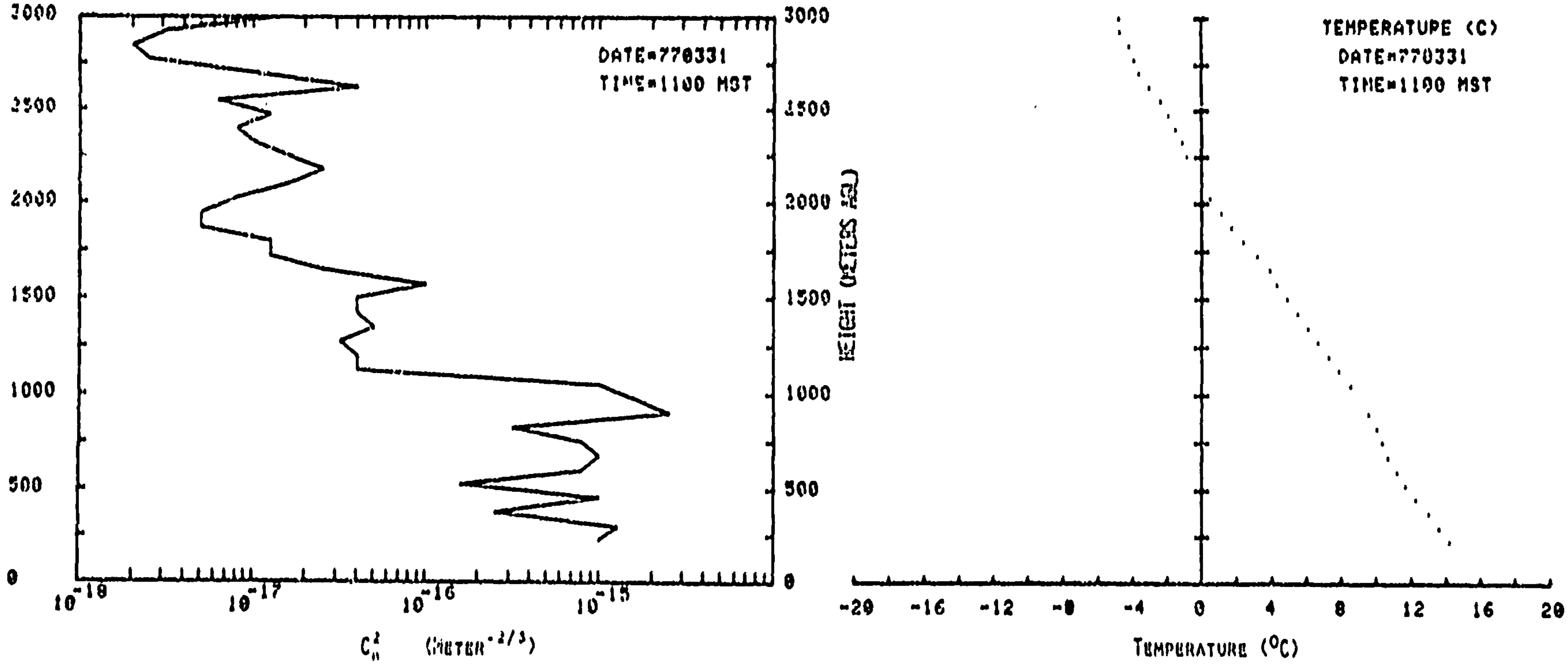
-16
-12
-8
-4
0
4
8
12
16
20
Temperature (°C)

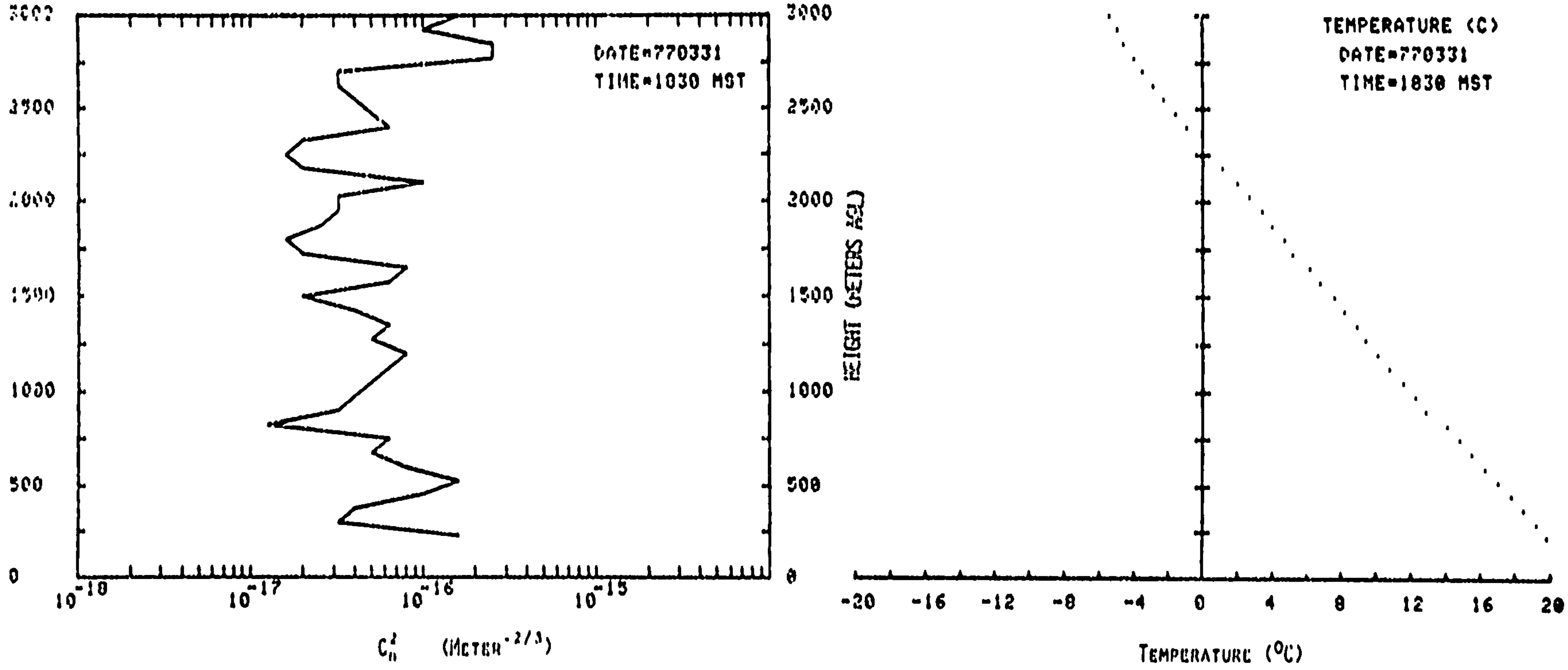

3000
2500
2000
1500
1000
500
0
DATE=770330
TIME=1800 MST
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770330
TIME=1300 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


3000
2500
2000
1500
1000
500
0
DATE=770331
TIME=0000 MST
10^-18
10^-17
10^-16
10^-15
C_n^2 (METER^-2/3)
3000
2500
2000
1500
1000
500
0

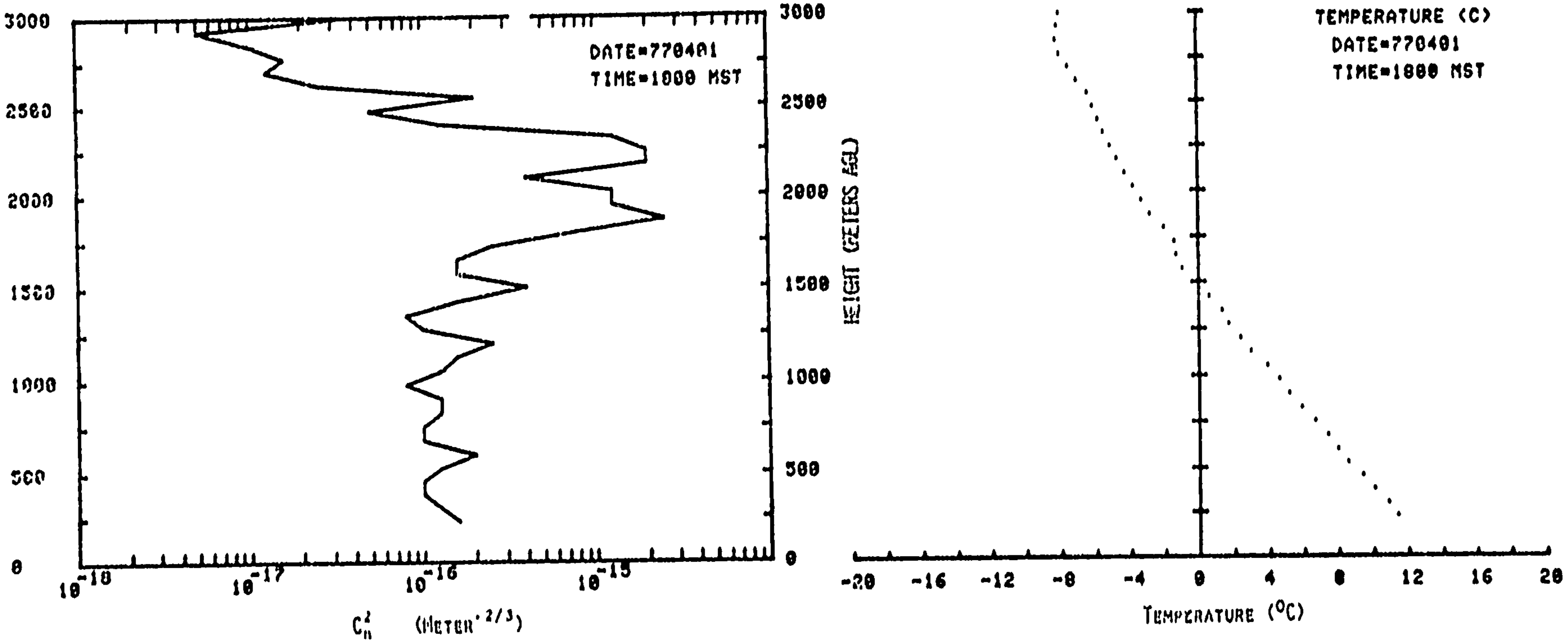

HEIGHT (METERS ASL)
TEMPERATURE (C)
DATE=770331
TIME=0000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

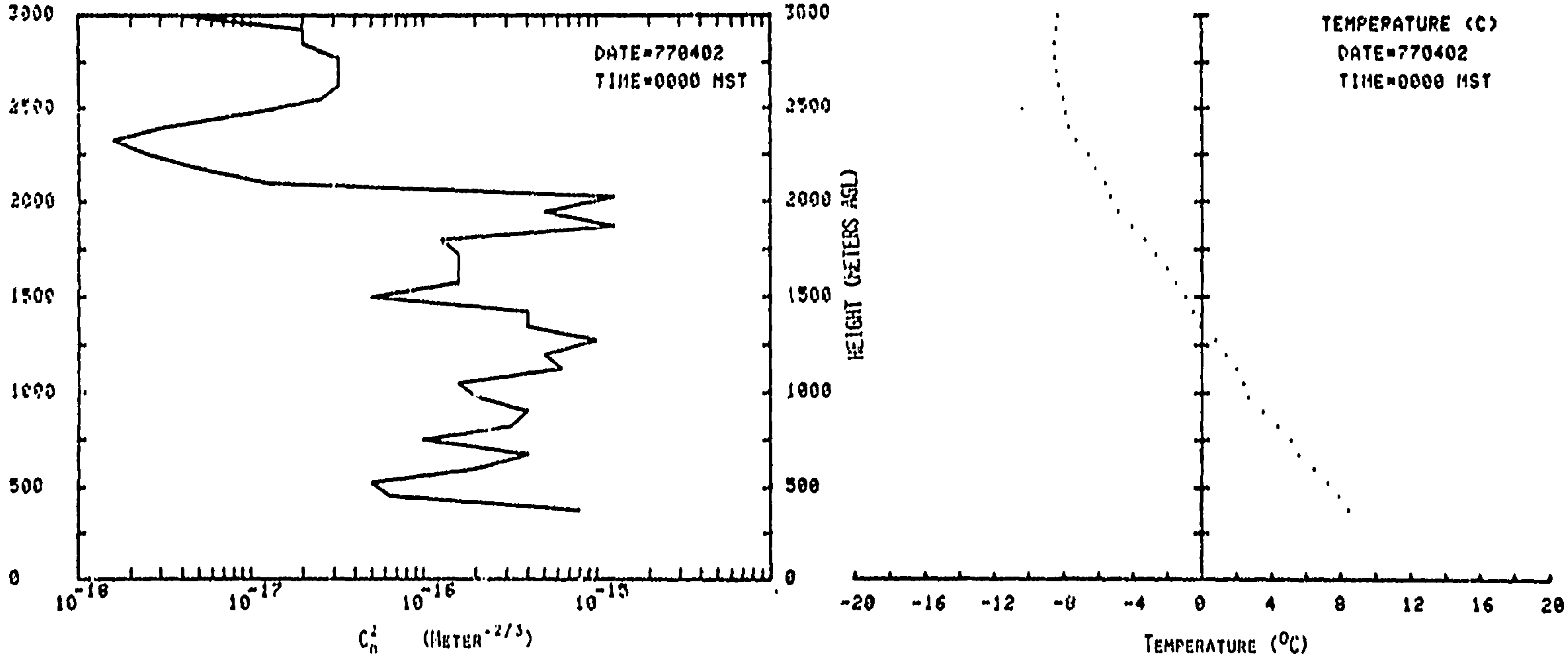

DATE=770331
TIME=500 MST
TEMPERATURE (C)
DATE=770331
TIME=500 MST
HEIGHT (METERS AGL)
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

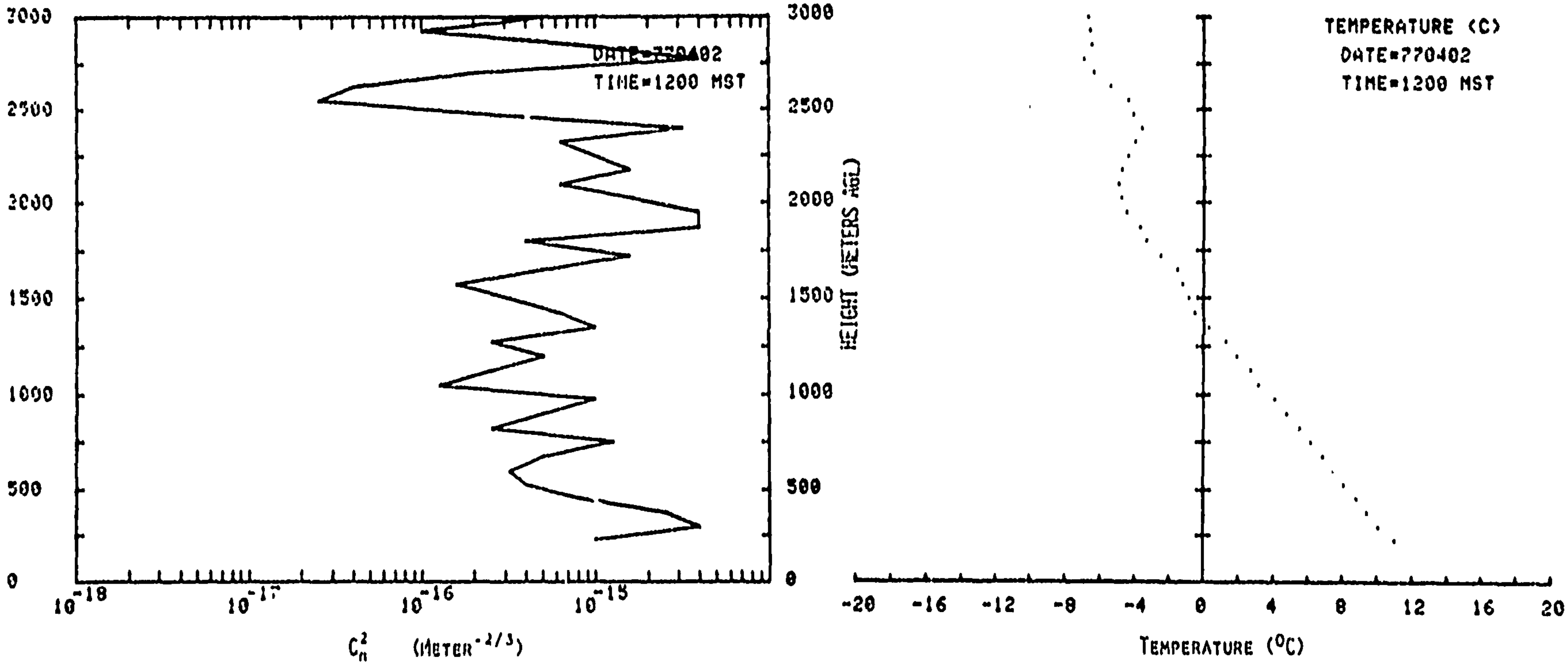
DATE=770331
TIME=1100 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770331
TIME=1100 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (^oC)

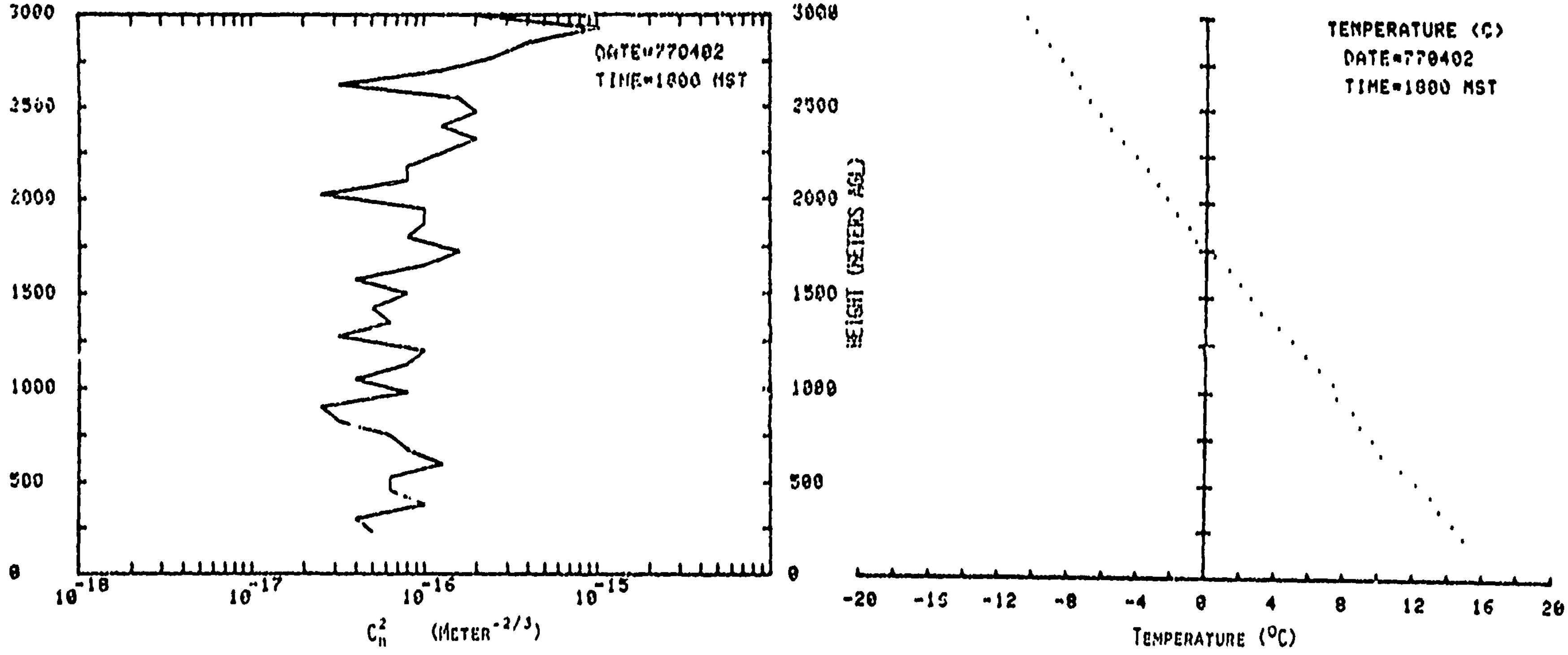


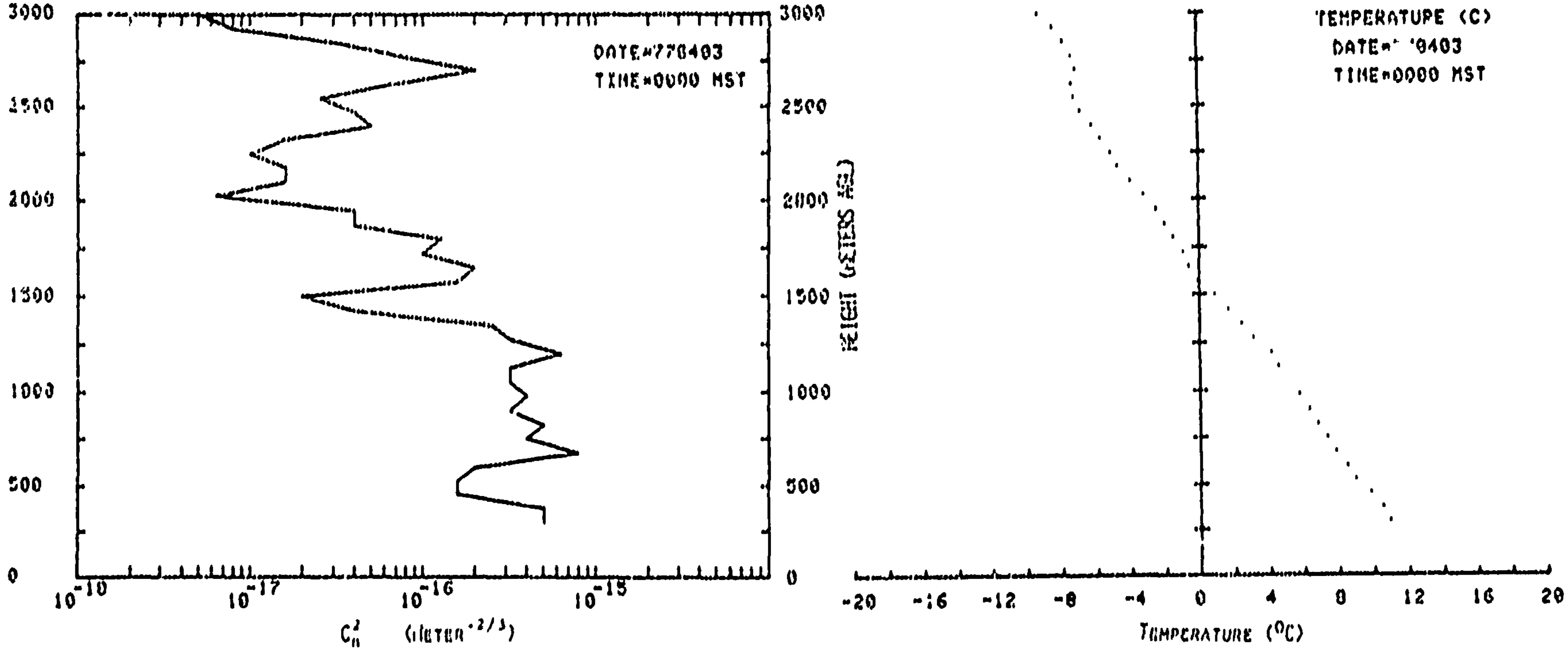
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
DATE=770331
TIME=1030 MST
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770331
TIME=1830 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

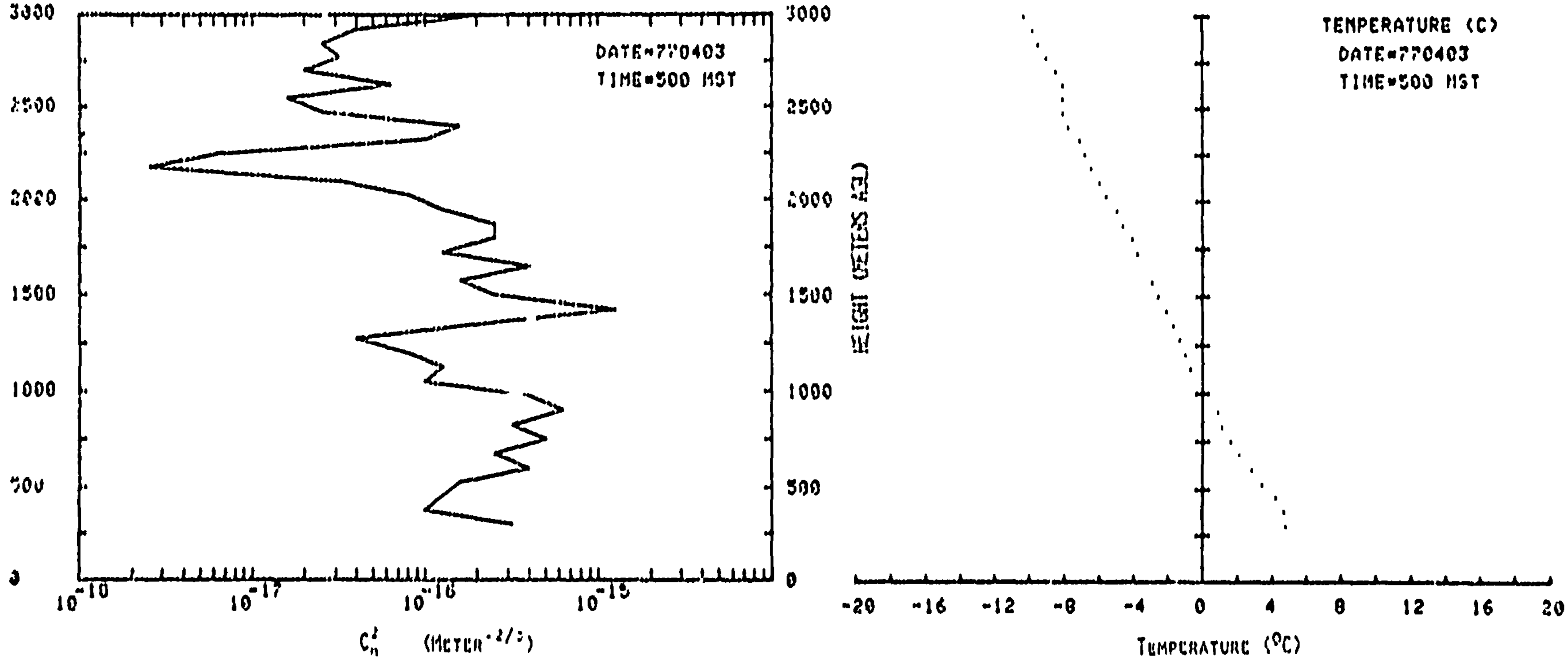

DATE=770401
TIME=1000 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770401
TIME=1000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

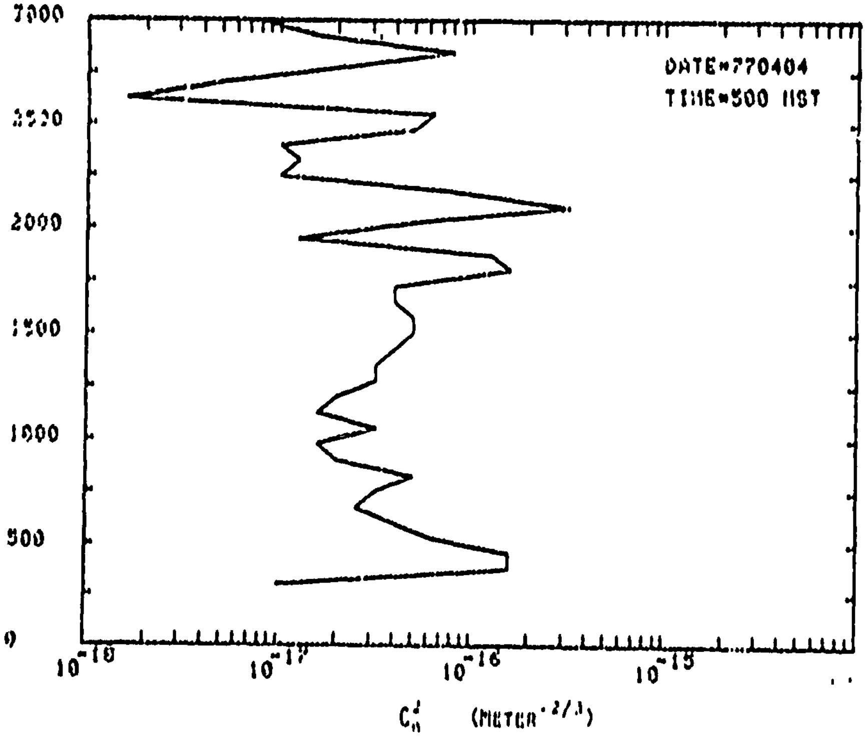

3000
2500
2000
1500
1000
500
0
DATE=770402
TIME=0000 MST
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770402
TIME=0000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

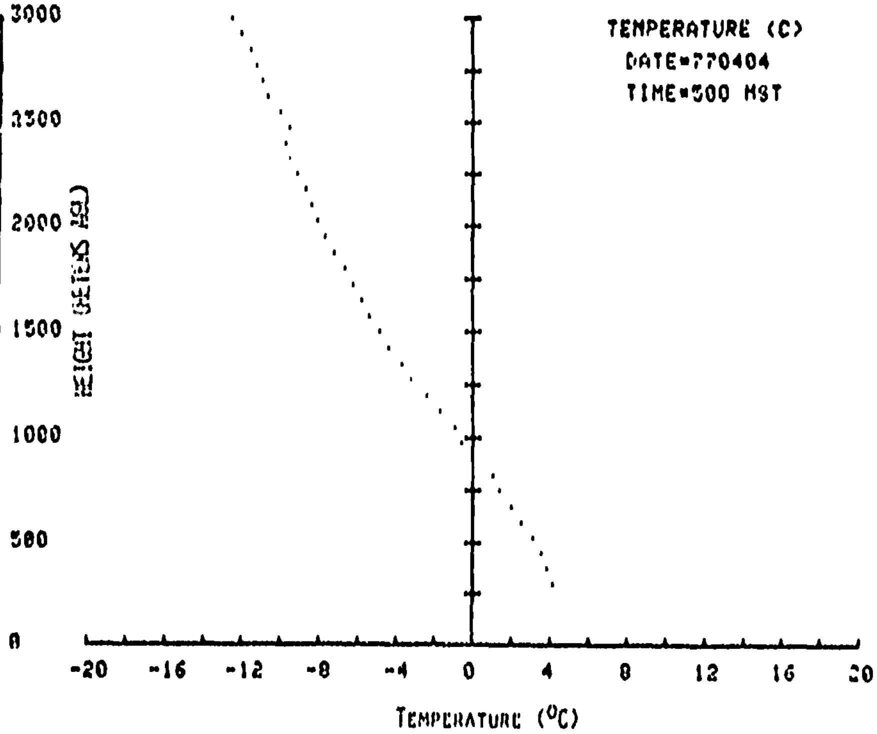

DATE=770402
TIME=1200 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770402
TIME=1200 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

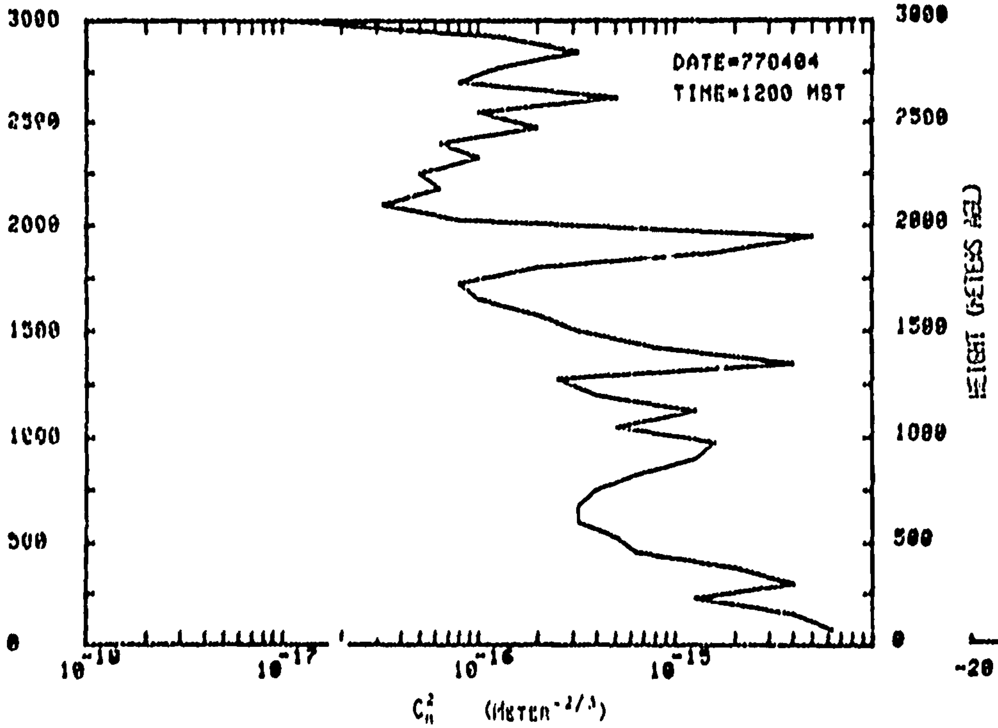

3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
DATE=770402
TIME=1800 MST
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770402
TIME=1800 MST
-20
-15
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

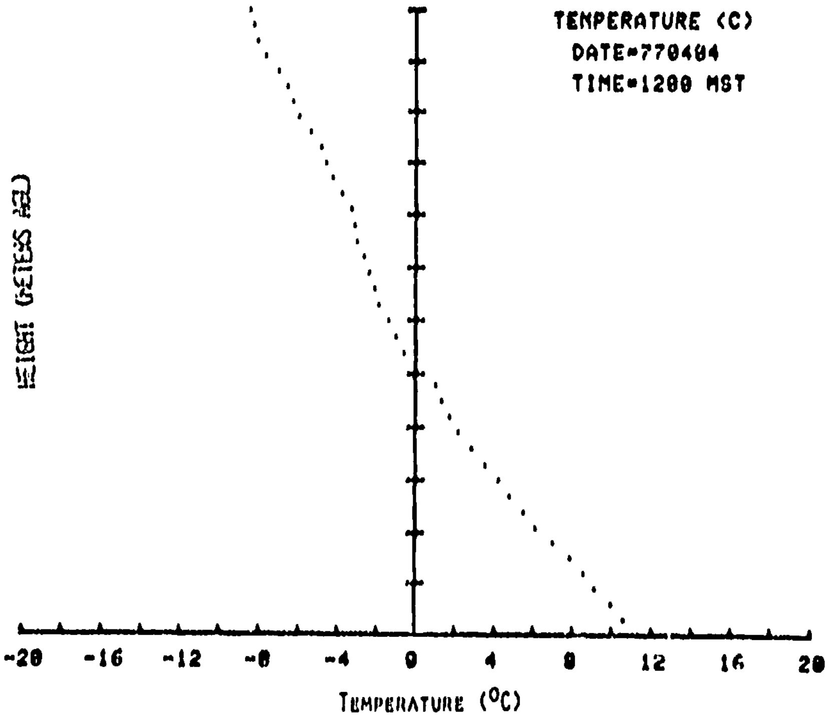
3000
2500
2000
1500
1000
500
0
DATE=770403
TIME=0000 MST
10^{-10}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=' '0403
TIME=0000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

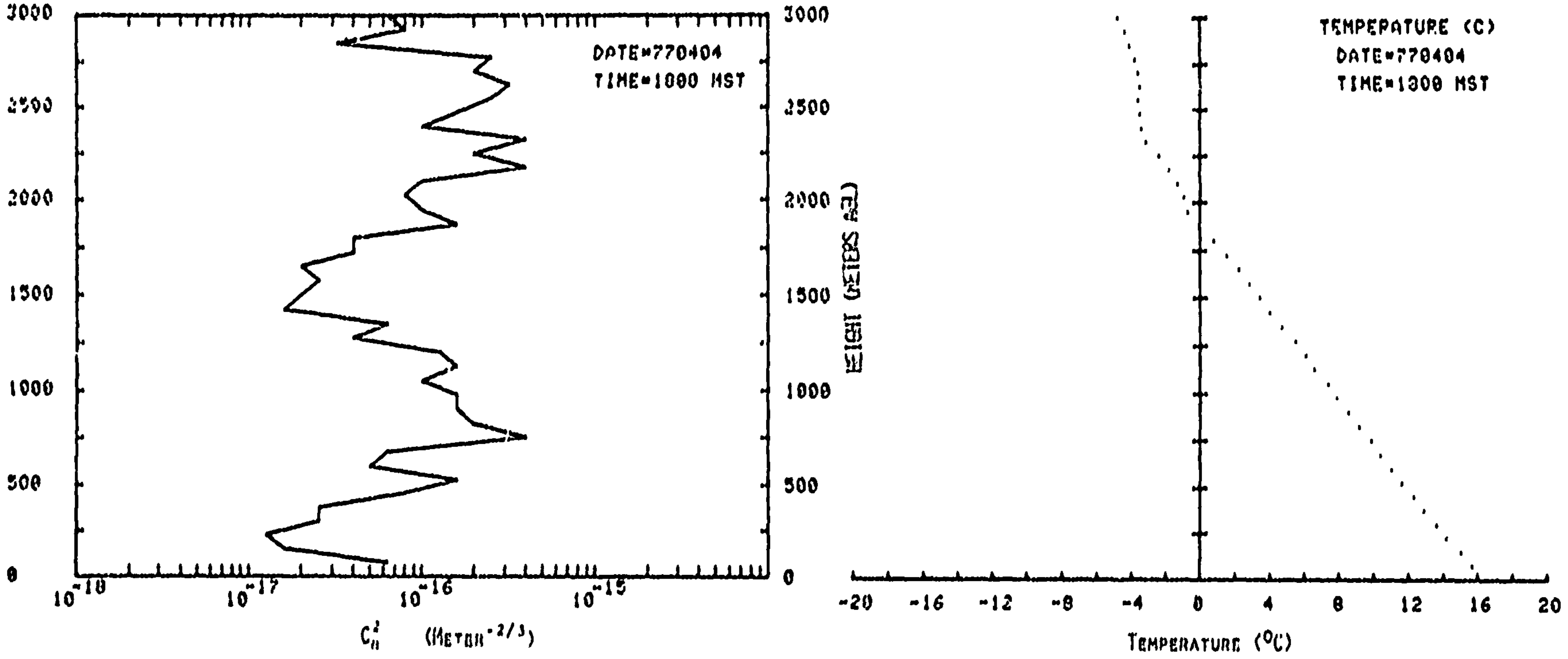

DATE=770403
TIME=500 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770403
TIME=500 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

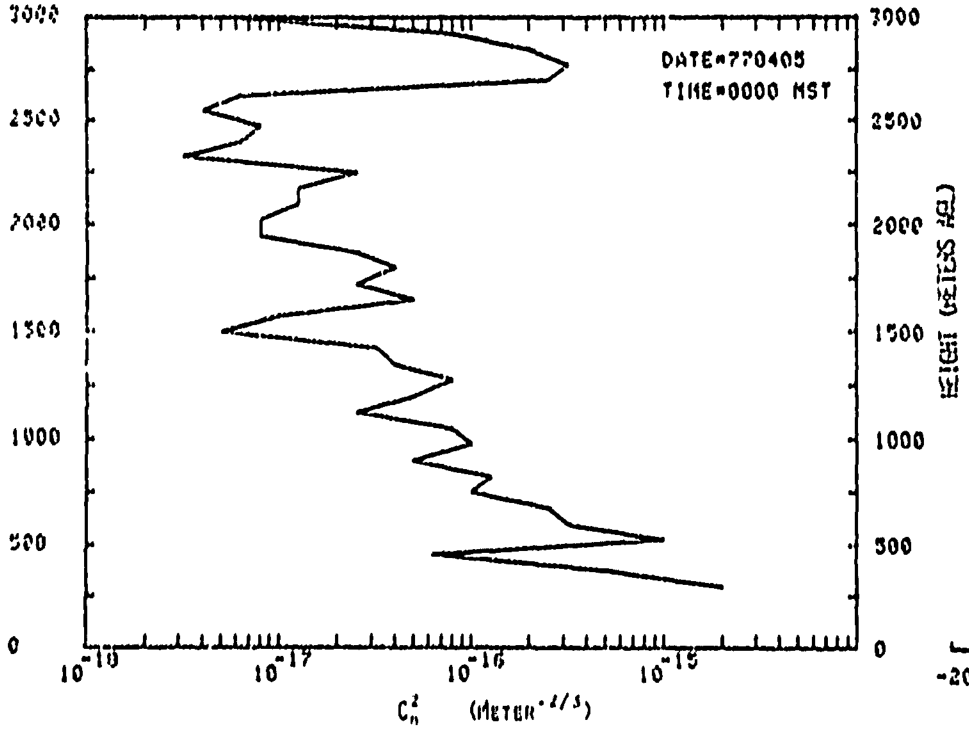

DATE=770404
TIME=500 MST
7000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)

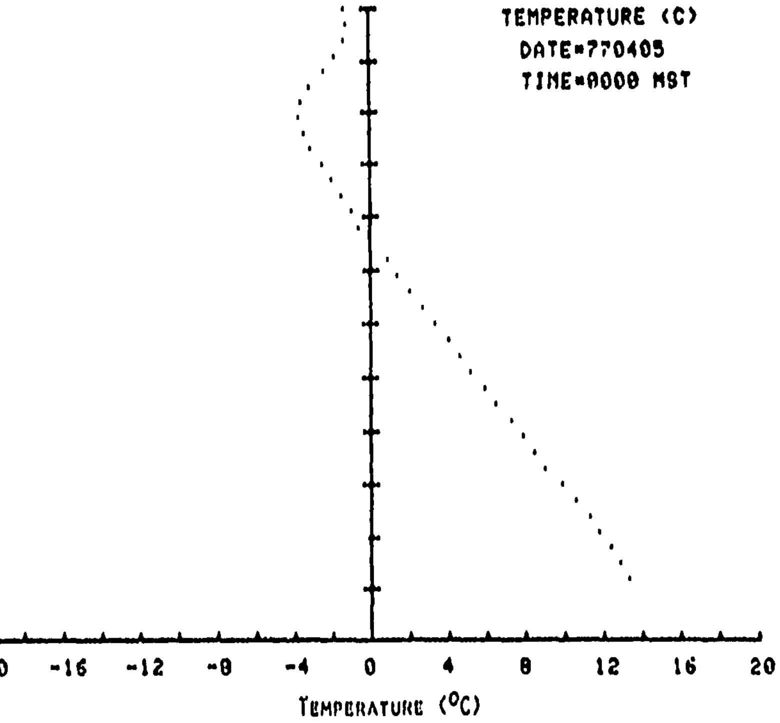

TEMPERATURE (C)
DATE=770404
TIME=500 MST
3000
2500
2000
1500
1000
500
0
HEIGHT (METERS AGL)
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


DATE=770404
TIME=1200 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)


TEMPERATURE (C)
DATE=770404
TIME=1200 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


DATE=770404
TIME=1000 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)
TEMPERATURE (C)
DATE=770404
TIME=1300 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)


DATE=770405
TIME=0000 MST
3000
2500
2000
1500
1000
500
0
10^{-18}
10^{-17}
10^{-16}
10^{-15}
C_n^2 (METER$^{-2/3}$)
HEIGHT (METERS AGL)


TEMPERATURE (C)
DATE=770405
TIME=0000 MST
-20
-16
-12
-8
-4
0
4
8
12
16
20
TEMPERATURE (°C)

WSMR 770325 900 MST

NOISE LEVEL = .0002
IAS = 115 MPH
ALTIMETER SETTING = 29.70

HEIGHT (M AGL)	T	CN2	LOG10 CN2
225 - 300	14.7	6.5E-16	-15.2
300 - 375	14.1	3E-16	-15.5
375 - 450	13.3	2.7E-16	-15.6
450 - 525	12.5	1.6E-15	-14.8
525 - 600	12.2	9.2E-16	-15
600 - 675	11.8	1E-15	-15
675 - 750	11.3	4.6E-16	-15.3
750 - 825	10.6	8.6E-16	-15.1
825 - 900	10	2.7E-16	-15.6
900 - 975	9.6	1.7E-16	-15.8
975 - 1050	9.2	7.2E-16	-15.1
1050 - 1125	8.5	1.8E-15	-14.7
1125 - 1200	7.9	2.4E-15	-14.6
1200 - 1275	7.4	1.9E-15	-14.7
1275 - 1350	7.1	1.7E-15	-14.8
1350 - 1425	6.6	2.1E-15	-14.7
1425 - 1500	6	1.2E-15	-14.9
1500 - 1575	5.5	2.1E-15	-14.7
1575 - 1650	5	1.2E-16	-15.9
1650 - 1725	4.4	3.9E-16	-15.4

WSMR 770325 1000 MST

NOISE LEVEL = .000032
IAS = 125 MPH
ALTIMETER SETTING = 29.74

HEIGHT (M AGL)	T	CN2	LOG10 CN2
0 - 75	19.2	9.3E-16	-15
75 - 150	18.7	6.2E-17	-16.2
150 - 225	18.2	8.3E-17	-16.1
225 - 300	17.6	6.6E-17	-16.2
300 - 375	16.8	8.3E-18	-17.1
375 - 450	16.1	8.6E-18	-17.1
450 - 525	15.3	1.9E-17	-16.7
525 - 600	14.8	1.1E-17	-17
600 - 675	14.1	3.3E-17	-16.5
675 - 750	13.5	2.3E-17	-16.6
750 - 825	12.7	1.6E-17	-16.8
825 - 900	11.9	3.3E-17	-16.5
900 - 975	11.1	6.2E-17	-16.2
975 - 1050	10.5	4.6E-17	-16.3
1050 - 1125	9.9	5.3E-17	-16.3
1125 - 1200	9.1	6.3E-17	-16.2
1200 - 1275	8.2	2.9E-17	-16.5
1275 - 1350	7.5	3.7E-17	-16.4
1350 - 1425	6.7	1.7E-16	-15.8
1425 - 1500	6.1	1.7E-16	-15.8
1500 - 1575	5.5	3.6E-17	-16.4
1575 - 1650	4.9	1.1E-16	-16
1650 - 1725	4.2	3.6E-17	-16.4
1725 - 1800	3.4	5.1E-17	-16.3
1800 - 1875	2.5	4.6E-17	-16.3
1875 - 1950	1.8	7.6E-17	-16.1
1950 - 2025	1.1	8.1E-17	-16.3
2025 - 2100	-.2	3.3E-17	-16.5
2100 - 2175	-.6	4.1E-17	-16.4
2175 - 2250	-.8	4.4E-17	-16.4
2250 - 2325	-1.7	6.9E-18	-17.2
2325 - 2400	-2.3	1.9E-17	-16.7
2400 - 2475	-2.9	6.1E-17	-16.2
2475 - 2550	-3.5	3.2E-17	-16.5
2550 - 2625	-4.3	7.5E-17	-16.1
2625 - 2700	-5	8.3E-17	-16.1
2700 - 2775	-5.6	3.1E 17	-16.5
2775 - 2850	-6.2	4.7E-17	-16.3
2850 - 2925	-6.8	3.3E-17	-16.5
2920 - 3000	-7.4	9.0E-17	-16

```
WSMR         770326     0 MST

NOISE LEVEL = .000125
IAS = 120 MPH
ALTIMETER SETTING = 29.82

HEIGHT (M AGL)     T       CN2     LOG10 CN2

225 - 300        12.4   1.7E-16    -15.8
300 - 375        12.1   1.1E-16    -15.9
375 - 450        11.9   1.5E-16    -15.8
450 - 525        11.4   1.8E-16    -15.7
525 - 600        10.7   1.5E-16    -15.8
600 - 675        10.2   1E-15      -15
675 - 750        9.8    6E-16      -15.2
750 - 825        9.1    1.6E-15    -14.8
825 - 900        8.7    6.2E-16    -15.2
900 - 975        7.9    2.5E-16    -15.6
975 - 1050       7.4    9.7E-17    -16
1050 - 1125      6.8    8.7E-17    -16.1
1125 - 1200      6.5    7.1E-16    -15.2
1200 - 1275      6      1.5E-16    -15.8
1275 - 1350      5.6    2.6E-16    -15.6
1350 - 1425      5      7.4E-16    -15.1
1425 - 1500      4.5    7.4E-16    -15.1
1500 - 1575      4.1    8E-16      -15.1
1575 - 1650      3.4    2.8E-17    -16.6
1650 - 1725      2.6    3.2E-16    -15.5
1725 - 1800      1.9    5.6E-16    -15.3
1800 - 1875      1.6    5.5E-16    -15.3
1875 - 1950      1.1    3.5E-16    -15.5
1950 - 2025      -.9    1.1E-16    -16
2025 - 2100      -.9    5.3E-17    -16.3
2100 - 2175      -.9    3E-17      -16.5
2175 - 2250      -1.5   4.6E-16    -15.3
2250 - 2325      -2.1   1.6E-16    -15.8
2325 - 2400      -2.8   1.5E-16    -15.8
2400 - 2475      -3.3   1E-16      -16
2475 - 2550      -3.8   7.2E-17    -16.1
2550 - 2625      -4.4   2.1E-16    -15.7
2625 - 2700      -4.9   4.1E-17    -16.4
2700 - 2775      -5.8   8.4E-18    -17.1
2775 - 2850      -6.2   3.2E-17    -16.5
2850 - 2925      -7     1.3E-16    -15.9
2925 - 3000      -7.5   9.4E-17    -16
```

```
WSMR         770326     1200 MST

NOISE LEVEL = .00016
IAS = 120 MPH
ALTIMETER SETTING = 29.74

HEIGHT (M AGL)     T       CN2     LOG10 CN2

225 - 300        14.5   1.8E-15    -14.7
300 - 375        13.4   1.7E-15    -14.8
375 - 450        12.7   1.1E-15    -15
450 - 525        12.2   8.3E-16    -15.1
525 - 600        11.7   4.2E-16    -15.4
600 - 675        11.2   3.6E-16    -15.4
675 - 750        10.5   2.5E-16    -15.6
750 - 825        9.5    2.3E-16    -15.6
825 - 900        8.9    1.1E-16    -16
900 - 975        8.5    6.9E-16    -15.2
975 - 1050       7.7    8.3E-16    -15.1
1050 - 1125      7      9.8E-16    -15
1125 - 1200      6.3    1.5E-15    -14.8
1200 - 1275      5.9    2.1E-16    -15.7
1275 - 1350      5.1    5.7E-16    -15.2
1350 - 1425      4.3    9.1E-16    -15
1425 - 1500      3.7    4.1E-17    -16.4
1500 - 1575      3.2    7.[illegible]E-17    -16.1
1575 - 1650      2.7    7.8E-17    -16.1
1650 - 1725      2.1    3.7E-17    -16.4
1725 - 1800      1.2    4.7E-17    -16.3
1800 - 1875      .7     1.3E-17    -16.9
1875 - 1950      .5     1.9E-16    -15.7
1950 - 2025      .4     3E-16      -15.5
2025 - 2100      .4     2.4E-16    -15.6
2100 - 2175      -.7    3E-16      -15.5
2175 - 2250      -1.3   3.3E-16    -15.5
2250 - 2325      -1.8   1.9E-17    -16.7
2325 - 2400      -2.4   8.4E-17    -16.1
2400 - 2475      -2.8   1.9E-16    -15.7
```

WSMR 770327 0 MST

NOISE LEVEL = 000063
IAS = 130 MPH
ALTIMETER SETTING = 29.8

HEIGHT (M AGL)	T	CN2	LOG10 CN2
225 - 300	4.8	6.5E-16	-15.2
300 - 375	4.3	2E-16	-15.7
375 - 450	3.8	1.9E-16	-15.7
450 - 525	3.1	2.2E-16	-15.7
525 - 600	2.6	9.8E-17	-16
600 - 675	2	2.4E-16	-15.6
675 - 750	1.5	2.4E-16	-15.6
750 - 825	0	2E-16	-15.7
825 - 900	-.1	2E-16	-15.7
900 - 975	-.5	1.5E-15	-14.8
975 - 1050	-.6	3.8E-16	-15.4
1050 - 1125	-1.1	2.4E-16	-15.6
1125 - 1200	-1.7	1.3E-16	-15.9
1200 - 1275	-2.3	2.7E-16	-15.6
1275 - 1350	-2.8	5.2E-16	-15.3
1350 - 1425	-3.4	2.9E-16	-15.5
1425 - 1500	-4.1	4E-17	-16.4
1500 - 1575	-4.7	3.2E-17	-16.5
1575 - 1650	-5.2	3.6E-17	-16.4
1650 - 1725	-5.7	1.2E-16	-15.9
1725 - 1800	-6	4.8E-17	-16.3
1800 - 1875	-6.3	3.5E-16	-15.5
1875 - 1950	-6.5	8.5E-16	-15.1
1950 - 2025	-6.7	2.5E-16	-15.6
2025 - 2100	-6.8	5.6E-17	-16.3
2100 - 2175	-6.6	9.3E-17	-16
2175 - 2250	-6.6	2.2E-16	-15.6
2250 - 2325	-6.7	4.3E-16	-15.4
2325 - 2400	-7.3	8.9E-18	-17
2400 - 2475	-8.2	1.2E-17	-16.9
2475 - 2550	-8.8	2.3E-17	-16.6
2550 - 2625	-9.5	1.9E-17	-16.7
2625 - 2700	-10.2	1.2E-17	-16.9
2700 - 2775	-10.9	1.7E-17	-16.8
2775 - 2850	-11.4	1.1E-17	-17
2850 - 2925	-12.1	2.1E-17	-16.7
2925 - 3000	-12.6	1.5E-17	-16.8

WSMR 770327 500 MST

NOISE LEVEL = .00005
IAS = 120 MPH
ALTIMETER SETTING = 29.78

HEIGHT (M AGL)	T	CN2	LOG10 CN2
300 - 375	3.1	3E-16	-15.5
375 - 450	2.6	3.1E-16	-15.5
450 - 525	1.9	2.3E-16	-15.6
525 - 600	1.3	4.1E-16	-15.4
600 - 675	1	9.7E-16	-15
675 - 750	0	6.7E-16	-15.2
750 - 825	-.7	3E-16	-15.5
825 - 900	-.7	3.5E-16	-15.5
900 - 975	-1.1	1.9E-15	-14.7
975 - 1050	-1.6	2E-15	-14.7
1050 - 1125	-2.2	1.7E-15	-14.8
1125 - 1200	-2.5	1.3E-15	-14.9
1200 - 1275	-2.6	2.6E-15	-14.6
1275 - 1350	-3.1	2.8E-15	-14.6
1350 - 1425	-3.9	1E-15	-15
1425 - 1500	-4.2	5.4E-16	-15.3
1500 - 1575	-4.5	6.4E-16	-15.2
1575 - 1650	-5.1	4.3E-16	-15.4
1650 - 1725	-5.8	3.9E-17	-16.4
1725 - 1800	-6.3	5.3E-17	-16.3
1800 - 1875	-6.9	4.7E-17	-16.3
1875 - 1950	-7.6	1.6E-17	-16.8
1950 - 2025	-8.1	2.3E-17	-16.6
2025 - 2100	-8.6	1.9E-17	-16.7
2100 - 2175	-9.1	9.3E-17	-16
2175 - 2250	-9.4	3.5E-17	-16.5
2250 - 2325	-9.9	9E-17	-16
2325 - 2400	-10.4	1.2E-16	-15.9
2400 - 2475	-10.9	1.6E-16	-15.8
2475 - 2550	-11.2	1.5E-16	-15.8
2550 - 2625	-11.7	2.6E-16	-15.6
2625 - 2700	-12.3	2E-16	-15.7
2700 - 2775	-12.9	1.3E-16	-15.9
2775 - 2850	-13.5	5.8E-17	-16.2
2850 - 2925	-13.9	8.3E-17	-16.1
2925 - 3000	-14.4	2.6E-17	-16.6

```
WSMR         770328     1800 MST

NOISE LEVEL = .00008
IAS = 125 MPH
ALTIMETER SETTING = 29.7

HEIGHT (M AGL)    T       CN2     LOG10 CN2

75 - 150         14.2   2.7E-16   -15.6
150 - 225        13.3   1.7E-16   -15.8
225 - 300        12.5   1.1E-16   -16
300 - 375        11.6   5.7E-17   -16.2
375 - 450        11.1   7.6E-17   -16.1
450 - 525        10.4   1.7E-16   -15.8
525 - 600        9.6    4.7E-17   -16.3
600 - 675        8.8    1.1E-16   -16
675 - 750        8.1    6.8E-17   -16.2
750 - 825        7.4    5.1E-17   -16.3
825 - 900        6.8    1.3E-16   -15.9
900 - 975        6.1    1.2E-16   -15.9
975 - 1050       5.3    1.2E-16   -15.9
1050 - 1125      4.6    6.1E-17   -16.2
1125 - 1200      4      1.8E-16   -15.7
1200 - 1275      3.3    5.9E-16   -15.2
1275 - 1350      2.8    9.1E-17   -16
1350 - 1425      2.2    2.9E-16   -15.5
1425 - 1500      1.7    3E-16     -15.5
1500 - 1575       .9    5.9E-16   -15.2
1575 - 1650      -.4    3.7E-16   -15.4
1650 - 1725      -.7    3.9E-16   -15.4
1725 - 1800      -.8    1.6E-16   -15.8
1800 - 1875      -1.4   6.6E-17   -16.2
1875 - 1950      -1.9   4.1E-17   -16.4
1950 - 2025      -2.2   1E-16     -16
2025 - 2100      -2.5   4E-16     -15.4
2100 - 2175      -2.7   2.1E-15   -14.7
2175 - 2250      -3     1.2E-15   -14.9
2250 - 2325      -3.3   1.6E-16   -15.8
2325 - 2400      -3.4   2.8E-16   -15.5
2400 - 2475      -3.7   1.1E-16   -16
2475 - 2550      -4.5   4.8E-16   -15.3
2550 - 2625      -4.9   5.7E-16   -15.2
2625 - 2700      -5.3   5.4E-16   -15.3
2700 - 2775      -5.7   4.4E-17   -16.4
2775 - 2850      -6.1   2E-17     -16.7
2850 - 2925      -6.6   3.1E-17   -16.5
2925 - 3000      -6.9   3.2E-17   -16.5
```

```
WSMR         770329     0 MST

NOISE LEVEL = .000063
IAS = 120 MPH
ALTIMETER SETTING = 29.67

HEIGHT (M AGL)    T       CN2     LOG10 CN2

225 - 300        11.3   2.3E-15   -14.6
300 - 375        11     7E-16     -15.2
375 - 450        10.2   3.2E-16   -15.5
450 - 525        9.3    6.5E-16   -15.2
525 - 600        8.4    5.2E-16   -15.3
600 - 675        8      3.1E-16   -15.5
675 - 750        7.5    1.8E-16   -15.7
750 - 825        7      1.4E-16   -15.9
825 - 900        6.2    2E-16     -15.7
900 - 975        5.8    2.6E-16   -15.6
975 - 1050       5.3    1.3E-16   -15.9
1050 - 1125      4.5    1.4E-16   -15.9
1125 - 1200      3.7    2.4E-16   -15.6
1200 - 1275      3      2.3E-16   -15.6
1275 - 1350      2.5    2.7E-17   -16.6
1350 - 1425      1.8    2.1E-17   -16.7
1425 - 1500      1.2    4.1E-17   -16.4
1500 - 1575       .3    2E-16     -15.7
1575 - 1650      -.8    1.1E-17   -17
1650 - 1725      -.8    8.5E-18   -17.1
1725 - 1800      -1.3   2.9E-17   -16.5
1800 - 1875      -2     7.5E-17   -16.1
1875 - 1950      -2.5   6.4E-17   -16.2
1950 - 2025      -3.1   5E-18     -17.3
2025 - 2100      -3.7   2.6E-17   -16.6
2100 - 2175      -4.2   2.3E-17   -16.6
2175 - 2250      -4.7   1.5E-16   -15.8
2250 - 2325      -5.4   3.4E-17   -16.5
2325 - 2400      -5.9   5.8E-17   -16.2
2400 - 2475      -6.3   3E-17     -16.5
2475 - 2550      -6.6   2.4E-17   -16.6
2550 - 2625      -7     6.6E-17   -16.2
2625 - 2700      -7.7   7.7E-17   -16.1
2700 - 2775      -8.4   4.8E-17   -16.3
2775 - 2850      -9     3.4E-17   -16.5
2850 - 2925      -9.7   7.2E-17   -16.1
2925 - 3000      -10.5  5.9E-17   -16.2
```

```
WSMR        770329    500 MST

NOISE LEVEL = .000125
IAS = 120 MPH
ALTIMETER SETTING = 29.72

HEIGHT (M AGL)     T       CN2      LOG10 CN2

150 - 225         9.7    2 8E-16     -15.5
225 - 300         9.1    4.2E-16     -15 4
300 - 375         8.3    1.5E-16     -15.8
375 - 450         7.8    2E-16       -15 7
450 - 525         7 1    2.5E-16     -15 6
525 - 600         6.5    2.9E-16     -15.5
600 - 675         5.8    2.8E-16     -15.5
675 - 750         5.2    2.7E-16     -15.6
750 - 825         4.3    1.7E-16     -15.8
825 - 900         3.9    3.4E-17     -16.5
900 - 975         3.3    1.3E-16     -15.9
975 - 1050        2.7    9E-17       -16
1050 - 1125       2      2.3E-16     -15.6
1125 - 1200       1.5    4.5E-16     -15.3
1200 - 1275        .8    4.8E-16     -15.3
1275 - 1350       -.6    3.4E-16     -15.5
1350 - 1425       -.6    2.7E-16     -15.6
1425 - 1500      -1.1    3.4E-16     -15.5
1500 - 1575      -1.8    1.6E-16     -15.8
1575 - 1650      -2.4    2.3E-16     -15.6
1650 - 1725      -3      2.2E-16     -15 7
1725 - 1800      -3.6    3.1E-16     -15.5
1800 - 1875      -4.4    5.5E-16     -15.3
1875 - 1950      -4.9    1.1E-15     -15
1950 - 2025      -5.4    5.4E-16     -15.3
2025 - 2100      -5.8    1.3E-16     -15.9
2100 - 2175      -6.3    1.5E-16     -15.8
2175 - 2250      -6.6    3.4E-16     -15.5
2250 - 2325      -7      7.5E-16     -15.1
2325 - 2400      -7.7    2E-15       -14.7
2400 - 2475      -8      3.2E-15     -14.5
2475 - 2550      -8      2.7E-15     -14.6
2550 - 2625      -8.3    2.7E-15     -14.6
2625 - 2700      -8.9    2.2E-17     -16.7
2700 - 2775      -9.4    1.7E-17     -16 8
2775 - 2850      -9.7    8.2E-18     -17.1
2850 · 2925      -10     2.9E-17     -16.5
2925   3000      -10.1   1.1E-17     -17
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```
WSMR        770329    1200 MST

NOISE LEVEL = .00004
IAS = 130 MPH
ALTIMETER SETTING = 29.77

HEIGHT (M AGL)     T       CN2      LOG10 CN2

150 - 225         10     1.1E-15     -14.9
225 - 300         9.     3.9E-16     -15.4
300 - 375         8.8    9 2E-17     -16
375 - 450         8.2    1.8E-16     -15.7
450 - 525         7.5    2.5E-16     -15.6
525 - 600         6.9    2.7E-16     -15.6
600 - 675         6.2    3.6E-16     -15.4
675 - 750         5.5    3.6E-16     -15.4
750 - 825         4.2    3E-16       -15.5
825 - 900         3.7    4.3E-16     -15.4
900 - 975         2.9    2.2E-16     -15.7
975 - 1050        2.3    2.2E-16     -15.7
1050 - 1125       1.7    1.1E-16     -16
1125 - 1200       1.3    1.7E-16     -15.8
1200 - 1275        .7    1.6E-16     -15.8
1275 - 1350       -.8    1.6E-16     -15.8
1350 - 1425       -.8    2.7E-16     -15.6
1425 - 1500      -1.3    7.5E-16     -15.1
1500 - 1575      -2      5E-16       -15.3
1575 - 1650      -2.4    2.7E-16     -15.6
1650 - 1725      -2.8    4.5E-16     -15.3
1725 - 1800      -3.4    4.2E-15     -14.4
1800 - 1875      -3.6    2 5E-15     -14.6
1875 - 1950      -3.5    5.3E-15     -14.3
1950 - 2025      -3.4    4.2E-15     -14.4
2025 - 2100      -3.4    3.2E-15     -14.5
2100 - 2175      -4 2    3.9E-15     -14.4
2175 - 2250      -4.8    5.1E-15     -14.3
2250 - 2325      -4.8    1.3E-15     -14.9
2325 - 2400      -4.7    2.1E-15     -14.7
2400 - 2475      -4.9    6.9E-15     -14.2
2475 - 2550      -5.2    2.2E-15     -14.7
2550 - 2625      -5.5    5.1E-16     -15.3
2625 - 2700      -6.2    9.3E-17     -16
2700 - 2775      -6.9    1E-17       -17
2775 - 2850      -7.5    6.7E-18     -17.2
2850 - 2925      -8.3    4.2E-18     -17.4
2925 - 3000      -8.9    9.8E-18     -17
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```
WSMR          770329     1800 MST

NOISE LEVEL = .0001
IAS = 120 MPH
ALTIMETER SETTING = 29.79

HEIGHT (M AGL)    T        CN2      LOG10 CN2

75 - 150          12.8   1.8E-16    -15.8
150 - 225         11.9   1.3E-16    -15.9
225 - 300         11.2   1.1E-16    -16
300 - 375         10.6   8.3E-17    -16.1
375 - 450         10.1   2.3E-16    -15.6
450 - 525         9.3    1.4E-16    -15.8
525 - 600         8.6    8.6E-17    -16.1
600 - 675         7.9    8.2E-17    -16.1
675 - 750         7.3    9.9E-17    -16
750 - 825         6.5    1.5E-16    -15.8
825 - 900         5.7    1.4E-16    -15.8
900 - 975         5      1E-16      -16
975 - 1050        4.6    1.2E-16    -15.9
1050 - 1125       4.1    2.3E-16    -15.6
1125 - 1200       3.7    2E-16      -15.7
1200 - 1275       3.1    2.4E-16    -15.6
1275 - 1350       2.6    5E-16      -15.3
1350 - 1425       2.2    7.5E-16    -15.1
1425 - 1500       1.9    1.4E-15    -14.9
1500 - 1575       1.2    1.6E-15    -14.8
1575 - 1650       .7     1.9E-15    -14.7
1650 - 1725      -.6     1.4E-16    -15.8
1725 - 1800      -.6     6.2E-17    -16.2
1800 - 1875      -1      2.8E-17    -16.6
1875 - 1950      -1.6    3.7E-17    -16.4
1950 - 2025      -2.2    3.5E-17    -16.5
2025 - 2100      -2.8    7.9E-17    -16.1
2100 - 2175      -3.3    9.5E-17    -16
2175 - 2250      -3.8    5.3E-16    -15.3
2250 - 2325      -4.6    5E-16      -15.3
2325 - 2400      -5.2    2.1E-16    -15.7
2400 - 2475      -5.8    1.4E-16    -15.9
2475 - 2550      -6.1    3.5E-16    -15.5
2550 - 2625      -6.3    1.8E-16    -15.8
2625 - 2700      -6.5    3.3E-17    -16.5
2700 - 2775      -7.2    4.8E-17    -16.3
2775 - 2850      -8.1    1.3E-17    -16.9
2850 - 2925      -9      2.4E-17    -16.6
2925 - 3000      -9.9    1.9E-17    -16.7
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WSMR          770330     0 MST

NOISE LEVEL = .00007
IAS = 130 MPH
ALTIMETER SETTING = 29.9

HEIGHT (M AGL)    T        CN2      LOG10 CN2

225 - 300         10     6.2E-16    -15.2
300 - 375         9.3    3.1E-16    -15.5
375 - 450         8.7    1.8E-16    -15.8
450 - 525         8.1    4.9E-16    -15.3
525 - 600         7.7    3.4E-16    -15.5
600 - 675         7.2    3.4E-16    -15.5
675 - 750         6.6    7.3E-16    -15.1
750 - 825         6      2.2E-16    -15.7
825 - 900         5.8    3.8E-16    -15.4
900 - 975         5      3.1E-16    -15.5
975 - 1050        4.5    5E-16      -15.3
1050 - 1125       3.8    9.7E-16    -15
1125 - 1200       3.4    5.4E-16    -15.3
1200 - 1275       3.1    5.9E-16    -15.2
1275 - 1350       2.7    8.4E-16    -15.1
1350 - 1425       2.5    7.2E-16    -15.1
1425 - 1500       2.1    2.7E-15    -14.6
1500 - 1575       1.5    7.6E-17    -16.1
1575 - 1650       .7     8.6E-18    -17.1
1650 - 1725      -.6     1.1E-17    -17
1725 - 1800      -.6     1.3E-17    -16.9
1800 - 1875      -.9     8E-18      -17.1
1875 - 1950      -1.4    2.5E-17    -16.6
1950 - 2025      -2      8E-18      -17.1
2025 - 2100      -2.5    1.3E-17    -16.9
2100 - 2175      -3      4.2E-17    -16.4
2175 - 2250      -3.6    5.7E-17    -16.2
2250 - 2325      -4.5    6.9E-17    -16.2
2325 - 2400      -5.2    4.8E-17    -16.3
2400 - 2475      -5.7    4.6E-17    -16.3
2475 - 2550      -5.9    5.3E-17    -16.3
2550 - 2625      -6.1    3.6E-17    -16.4
2625 - 2700      -6.4    1.1E-17    -17
2700 - 2775      -6.6    1.3E-17    -16.9
2775 - 2850      -6.8    2E-17      -16.7
2850 - 2925      -7.2    3.5E-18    -17.5
2925 - 3000      -7.3    1.8E-17    -16.7
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WSMR          770330      900 MST

NOISE LEVEL = .00002
IAS = 120 MPH
ALTIMETER SETTING = 30

HEIGHT (M AGL)     T        CN2      LOG10 CN2

150 - 225         7.7    2.9E-16     -15.5
225 - 300         7.8    3.3E-16     -15.5
300 - 375         7.8    1.6E-16     -15.8
375 - 450         7.4    1.4E-16     -15.9
450 - 525         6.8    1.2E-16     -15.9
525 - 600         6.2    6.6E-17     -16.2
600 - 675         5.7    7.5E-17     -16.1
675 - 750         5.1    3.7E-16     -15.4
750 - 825         4.4    7.9E-16     -15.1
825 - 900         4      2.8E-16     -15.6
900 - 975         3.5    7.6E-16     -15.1
975 - 1050        2.9    1.3E-15     -14.9
1050 - 1125       2.3    2.8E-16     -15.6
1125 - 1200       1.7    4.5E-16     -15.3
1200 - 1275       1.2    7.3E-16     -15.1
1275 - 1350       .8     7E-16       -15.2
1350 - 1425       0      1.3E-16     -15.9
1425 - 1500      -.6     3.7E-17     -16.4
1500 - 1575      -.6     4.8E-16     -15.3
1575 - 1650      -1.1    3.1E-17     -16.5
1650 - 1725      -1.6    2.4E-17     -16.6
1725 - 1800      -2      8.7E-18     -17.1
1800 - 1875      -2.2    2.4E-17     -16.6
1875 - 1950      -2.4    2.7E-17     -16.6
1950 - 2025      -2.4    2.3E-17     -16.6
2025 - 2100      -2.4    1.4E-17     -16.9
2100 - 2175      -2.6    6.9E-17     -16.2
2175 - 2250      -3      3.6E-18     -17.4
2250 - 2325      -3.5    5E-18       -17.3
2325 - 2400      -3.9    7.6E-18     -17.1
2400 - 2475      -4.3    3.4E-18     -17.5
2475 - 2550      -4.7    2E-18       -17.7
2550 - 2625      -5.2    1.6E-18     -17.8
2625 - 2700      -5.7    2.6E-18     -17.6
2700 - 2775      -6.2    1.5E-18     -17.8
2775 - 2850      -6.5    5.8E-18     -17.2
2850 - 2925      -6.7    7.9E-18     -17.1
2925 - 3000      -7      4.3E-18     -17.4
```

```
WSMR          770330     1200 MST

NOISE LEVEL = .00007
IAS = 125 MPH
ALTIMETER SETTING = 30.12

HEIGHT (M AGL)     T        CN2      LOG10 CN2

150 - 225         13.5   4.2E-15     -14.4
225 - 300         13     4.9E-16     -15.3
300 - 375         12.2   9.2E-16     -15
375 - 450         11.5   5.7E-16     -15.2
450 - 525         10.7   6E-16       -15.2
525 - 600         10.1   4.6E-16     -15.3
600 - 675         9.3    5.3E-16     -15.3
675 - 750         8.4    4.7E-16     -15.3
750 - 825         7.3    2.9E-16     -15.5
825 - 900         6.7    3.8E-16     -15.4
900 - 975         6.1    1.6E-16     -15.8
975 - 1050        5.5    7.7E-17     -16.1
1050 - 1125       4.8    3.4E-16     -15.5
1125 - 1200       4.2    1.4E-16     -15.8
1200 - 1275       3.4    3.3E-16     -15.5
1275 - 1350       2.7    3E-16       -15.5
1350 - 1425       1.9    1.5E-16     -15.8
1425 - 1500       1.3    9.2E-16     -15
1500 - 1575      -.2     9.4E-16     -15
1575 - 1650      -.6     5.1E-16     -15.3
1650 - 1725      -.6     3.8E-16     -15.4
1725 - 1800      -1      7.4E-16     -15.1
1800 - 1875      -1.5    2.7E-16     -15.6
1875 - 1950      -2      5.3E-16     -15.3
1950 - 2025      -2      7E-16       -15.2
2025 - 2100      -1.9    3.7E-16     -15.4
2100 - 2175      -2      1.7E-15     -14.8
2175 - 2250      -2.4    2.4E-16     -15.6
2250 - 2325      -3.3    4.1E-17     -16.4
2325 - 2400      -4.1    1.1E-16     -15.9
2400 - 2475      -4.6    8E-16       -15.1
2475 - 2550      -4.8    1.1E-15     -15
2550 - 2625      -4.3    5.9E-16     -15.2
2625 - 2700      -4.6    8.1E-17     -16.1
2700 - 2775      -5.1    2.3E-17     -16.6
2775 - 2850      -5.5    4.8E-18     -17.3
2850 - 2925      -6      3.6E-18     -17.4
2925 - 3000      -6.3    4.5E-18     -17.3
```

WSMR 770330 1000 MST

NOISE LEVEL = .00005
IAS = 120 MPH
ALTIMETER SETTING = 30.01

HEIGHT (M AGL)	T	CN2	LOG10 CN2
150 - 225	16.7	2.2E-16	-15.6
225 - 300	16	1.5E-16	-15.8
300 - 375	15.4	3.8E-16	-15.4
375 - 450	14.8	2.4E-16	-15.6
450 - 525	14.1	1.3E-16	-15.9
525 - 600	13.4	2.6E-16	-15.6
600 - 675	12.7	7.4E-17	-16.1
675 - 750	12	4.4E-16	-15.4
750 - 825	11.3	1.7E-16	-15.8
825 - 900	10.5	1.3E-16	-15.9
900 - 975	9.8	1E-17	-17
975 - 1050	9.1	2.9E-17	-16.5
1050 - 1125	8.3	4E-17	-16.4
1125 - 1200	7.6	8.4E-17	-16.1
1200 - 1275	6.8	3.3E-17	-16.5
1275 - 1350	6.1	2.3E-17	-16.6
1350 - 1425	5.4	1.4E-17	-16.9
1425 - 1500	4.7	1.3E-17	-16.9
1500 - 1575	4	4.6E-17	-16.3
1575 - 1650	3.5	1.2E-16	-15.9
1650 - 1725	2.9	2.4E-16	-15.6
1725 - 1800	2.3	3.2E-16	-15.5
1800 - 1875	1.5	1.8E-16	-15.7
1875 - 1950	1	8.5E-17	-16.1
1950 - 2025	0	1E-16	-16
2025 - 2100	-.7	8.4E-17	-16.1
2100 - 2175	-.7	2E-16	-15.7
2175 - 2250	-1.2	5.4E-17	-16.3
2250 - 2325	-2	2E-16	-15.7
2325 - 2400	-2.6	5.4E-16	-15.3
2400 - 2475	-3.2	1E-15	-15
2475 - 2550	-3.6	6.8E-16	-15.2
2550 - 2625	-3.9	6E-16	-15.2
2625 - 2700	-4.2	2.3E-16	-15.6
2700 - 2775	-4.5	2E-17	-16.7
2775 - 2850	-4.9	3E-17	-16.5
2850 - 2925	-5.4	1.7E-17	-16.8
2925 - 3000	-5.7	1.3E-17	-16.9

WSMR 770331 0 MST

NOISE LEVEL = .0001
IAS = 130 MPH
ALTIMETER SETTING = 30.05

HEIGHT (M AGL)	T	CN2	LOG10 CN2
225 - 300	13	6.2E-16	-15.2
300 - 375	12.8	4.8E-16	-15.3
375 - 450	12.6	2.3E-15	-14.6
450 - 525	12.5	1.3E-15	-14.9
525 - 600	12.3	2.5E-15	-14.6
600 - 675	11.8	1.5E-15	-14.8
675 - 750	11.3	1E-15	-15
750 - 825	10.6	3.7E-16	-15.4
825 - 900	10	4.2E-16	-15.4
900 - 975	9.1	2.4E-16	-15.6
975 - 1050	8.7	2E-16	-15.7
1050 - 1125	8.1	1.6E-16	-15.8
1125 - 1200	7.5	1E-16	-16
1200 - 1275	6.8	9.5E-17	-16
1275 - 1350	6.3	6.6E-17	-16.2
1350 - 1425	5.7	1.9E-16	-15.7
1425 - 1500	5.3	1.5E-16	-15.8
1500 - 1575	4.9	1.7E-16	-15.8
1575 - 1650	4.4	1.3E-17	-16.9
1650 - 1725	3.8	9.9E-18	-17
1725 - 1800	3.4	9.1E-18	-17
1800 - 1875	2.9	1.3E-17	-16.9
1875 - 1950	2.6	1.4E-17	-16.9
1950 - 2025	2.2	3.8E-16	-15.4
2025 - 2100	1.6	2.7E-16	-15.5
2100 - 2175	1	1.1E-16	-16
2175 - 2250	-.1	3.3E-16	-15.5
2250 - 2325	-.6	2.5E-16	-15.6
2325 - 2400	-.9	2.8E-17	-16.6
2400 - 2475	-1.6	4.1E-17	-16.4
2475 - 2550	-2.2	2E-17	-16.7
2550 - 2625	-2.8	1.3E-17	-16.9
2625 - 2700	-3.4	1.2E-17	-16.9
2700 - 2775	-3.9	2.1E-17	-16.7
2775 - 2850	-4.4	4.8E-17	-16.3
2850 - 2925	-4.9	1.9E-17	-16.7
2925 - 3000	-5.2	2E-17	-16.7

```
WSMR          770331     800 MST

NOISE LEVEL = .00006
IAS = 120 MPH
ALTIMETER SETTING = 30.02

HEIGHT (M AGL)     T       CN2     LOG10 CN2

150 - 225         10.9  1.1E-15    -14.9
225 - 300         10.7  8.0E-16    -15.1
300 - 375         10.5  2.3E-16    -15.6
375 - 450         10.3  5.3E-16    -15.3
450 - 525         10    8.7E-16    -15.1
525 - 600         9.7   1.3E-15    -14.9
600 - 675         9.2   4.6E-16    -15.3
675 - 750         8.5   8.3E-17    -16.1
750 - 825         7.7   7E-17      -16.2
825 - 900         7.3   1.3E-16    -15.9
900 - 975         7.1   3.9E-16    -15.4
975 - 1050        6.9   6.8E-16    -15.2
1050 - 1125       6.7   2.1E-17    -16.7
1125 - 1200       6.6   5E-17      -16.3
1200 - 1275       6.6   3.3E-17    -16.5
1275 - 1350       6.5   1.3E-16    -15.9
1350 - 1425       6     7.8E-17    -16.1
1425 - 1500       5.5   9.4E-17    -16
1500 - 1575       4.8   1.3E-16    -15.9
1575 - 1650       4.2   2.6E-17    -16.6
1650 - 1725       3.5   2.5E-17    -16.6
1725 - 1800       3     6.9E-18    -17.2
1800 - 1875       2.3   1.7E-17     16.8
1875 - 1950       1.7   3.7E-17    -16.4
1950 - 2025       1.3   2E-17      -16.7
2025 - 2100       .9    2.1E-17    -16.7
2100 - 2175      -.5    1.1E-17    -16.9
2175 - 2250      -.5    5.4E-17    -16.3
2250 - 2325      -.5    2.6E-17    -16.6
2325 - 2400      -.9    1.7E-17    -16.8
2400 - 2475      -1.3   1E-17      -17
2475 - 2550      -1.7   8.6E-18    -17.1
2550 - 2625      -2.2   6E-17      -16.2
2625 - 2700      -2.6   1.6E-15    -14.8
2700 - 2775      -3.1   5.9E-17    -16.2
2775 - 2850      -3.6   1.1E-16    -16
2850 - 2925      -4.1   5.7E-17    -16.2
2925 - 3000      -4.5   2.1E-17    -16.7
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WSMR          770331     1100 MST

NOISE LEVEL = .00006
IAS = 120 MPH
ALTIMETER SETTING = 30.07

HEIGHT (M AGL)     T       CN2     LOG10 CN2

150 - 225         14.2  9.5E-16    -15
225 - 300         13.6  1.2E-15    -14.9
300 - 375         13    2.7E-16    -15.6
375 - 450         12.3  9E-16      -15
450 - 525         11.7  1.7E-16    -15.8
525 - 600         11.2  8.4E-16    -15.1
600 - 675         10.7  9.5E-16    -15
675 - 750         10.4  8.1E-16    -15.1
750 - 825         10.1  3E-16      -15.5
825 - 900         9.6   2.5E-15    -14.6
900 - 975         9.1   1.8E-15    -14.8
975 - 1050        8.6   9.7E-16    -15
1050 - 1125       7.9   4E-17      -16.4
1125 - 1200       7.3   3.7E-17    -16.4
1200 - 1275       6.7   3E-17      -16.5
1275 - 1350       6.1   5.4E-17    -16.3
1350 - 1425       5.5   3.8E-17    -16.4
1425 - 1500       4.9   4.3E-17    -16.4
1500 - 1575       4.3   1E-16      -16
1575 - 1650       3.9   2.3E-17    -16.6
1650 - 1725       3.2   1.3E-17    -16.9
1725 - 1800       2.4   1.2E-17    -16.9
1800 - 1875       1.7   5.3E-18    -17.3
1875 - 1950       1.1   4.8E-18    -17.3
1950 - 2025       .5    8E-18      -17.1
2025 - 2100      -.8    1.5E-17    -16.8
2100 - 2175      -.8    2.3E-17    -16.6
2175 - 2250      -.8    1.6E-17    -16.8
2250 - 2325      -1.1   9.3E-18    -17
2325 - 2400      -1.5   7.1E-18    -17.1
2400 - 2475      -1.9   1 2E-17    -16.9
2475 - 2550      -2.4   5.8E-18    -17.2
2550 - 2625      -3     3.6E-17    -16.4
2625 - 2700      -3.6   1.1E-17    -17
2700 - 2775      -3.9   2.5E-18    -17.6
2775 - 2850      -4.2   2.1E-18    -17.7
2850 - 2925      -4.7   3.4E-18    -17.5
2925 - 3000      -4.8   1.4E-17    -16.9
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WSMR        770331    1830 MST

NOISE LEVEL =  .000063
IAS = 125 MPH
ALTIMETER SETTING = 29 03

HEIGHT (M AGL)     T       CN2      LOG10 CN2

150 - 225         19.8   1.7E-16    -15.8
225 - 300         19.2   3.4E-17    -16.5
300 - 375         18.5   3.8E-17    -16.4
375 - 450         17.8   9.8E-17    -16
450 - 525         17     1.5E-16    -15.8
525 - 600         16.3   8.8E-17    -16.1
600 - 675         15.5   5.4E-17    -16.3
675 - 750         14.8   6.6E-17    -16.2
750 - 825         14.1   1.3E-17    -16.9
825 - 900         12.9   3.4E-17    -16.5
900 - 975         12.3   4.3E-17    -16.4
975 - 1050        11.6   5.4E-17    -16.3
1050 - 1125       10.8   6.3E-17    -16.2
1125 - 1200       10.1   7.7E-17    -16.1
1200 - 1275       9.4    4.6E-17    -16.3
1275 - 1350       8.7    6.1E-17    -16.2
1350 - 1425       8.2    3.9E-17    -16.4
1425 - 1500       7.6    2.1E-17    -16.7
1500 - 1575       6.8    5.7E-17    -16.2
1575 - 1650       6.2    7.1E-17    -16.1
1650 - 1725       5.2    1.8E-17    -16.7
1725 - 1800       4.7    1.6E-17    -16.8
1800 - 1875       4      2.6E-17    -16.6
1875 - 1950       3.4    3.4E-17    -16.5
1950 - 2025       2.7    2.9E-17    -16.5
2025 - 2100       2      9.9E-17    -16
2100 - 2175       1.1    2.2E-17    -16.7
2175 - 2250       1      1.8E-17    -16.8
2250 - 2325      -.9     1.9E-17    -16.7
2325 - 2400      -.9     7E-17      -16.2
2400 - 2475      -1.6    4.7E-17    -16.3
2475 - 2550      -2.3    3.9E-17    -16.4
2550 - 2625      -2.9    2.9E-17    -16.5
2625 - 2700      -3.5    3.4E-17    -16.5
2700 - 2775      -4      2.5E-16    -15.6
2775 - 2850      -4.6    2.3E-16    -15.6
2850 - 2925      -5      1E-16      -16
2925 - 3000      -5.4    1.7E-16    -15.8
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WSMR        770401    1800 MDT

NOISE LEVEL = .00004
IAS = 120 MPH
ALTIMETER SETTING = 29 79

HEIGHT (M AGL)     T       CN2      LOG10 CN2

150 - 225         11.4   1.5E-16    -15.8
225 - 300         10.9   1.1E-16    -15.9
300 - 375         10.1   9.3E-17    -16
375 - 450         9.4    9.4E-17    -16
450 - 525         8.6    1.1E-16    -15.9
525 - 600         8      1.9E-16    -15.7
600 - 675         7.4    1E-16      -16
675 - 750         6.7    9.8E-17    -16
750 - 825         5.9    1.3E-16    -15.9
825 - 900         5.2    1.3E-16    -15.9
900 - 975         4.6    8.4E-17    -16.1
975 - 1050        3.9    1.3E-16    -15.9
1050 - 1125       3      1.5E-16    -15.8
1125 - 1200       2.4    2.2E-16    -15.6
1200 - 1275       1.7    1.1E-16    -16
1275 - 1350       1.3    8.3E-17    -16.1
1350 - 1425       .6     1.6E-16    -15.8
1425 - 1500      -.4     4E-16      -15.4
1500 - 1575      -.9     1.7E-16    -15.8
1575 - 1650      -1.3    1.7E-16    -15.8
1650 - 1725      -1.4    2.6E-16    -15.6
1725 - 1800      -2      7.2E-16    -15.1
1800 - 1875      -2.8    2.4E-15    -14.6
1875 - 1950      -3.3    1.2E-15    -14.9
1950 - 2025      -3.8    1.2E-15    -14.9
2025 - 2100      -4.3    4E-16      -15.4
2100 - 2175      -4.7    2.1E-15    -14.7
2175 - 2250      -5.1    2.1E-15    -14.7
2250 - 2325      -5.8    1.4E-15    -14.9
2325 - 2400      -5.8    1.3E-16    -15.9
2400 - 2475      -6.1    5.1E-17    -16.3
2475 - 2550      -6.4    2E-16      -15.7
2550 - 2625      -7      2.7E-17    -16.6
2625 - 2700      -7.5    1.1E-17    -16.9
2700 - 2775      -8      1.5E-17    -16.8
2775 - 2850      -8.2    9E-18      -17
2850 - 2925      -8.1    5.1E-18    -17.3
2925 - 3000      -8      3.5E-17    -16.5
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WSMR        770402     0 MST

NOISE LEVEL =  .00002
IAS = 120 MPH
ALTIMETER SETTING = 29.83

HEIGHT (M AGL)    T       CN2       LOG10 CN2

 300 -  375      8.5    7.1E-16     -15.1
 375 -  450      7.9    7E-17       -16.2
 450 -  525      7.3    5E-17       -16.3
 525 -  600      6.5    2.2E-16     -15.7
 600 -  675      5.6    3.9E-16     -15.4
 675 -  750      5.1    1.1E-16     -16
 750 -  825      4.4    3.5E-16     -15.5
 825 -  900      3.5    4.1E-16     -15.4
 900 -  975      2.7    1.8E-16     -15.7
 975 - 1050      2.4    1.5E-16     -15.8
1050 - 1125      2      6.3E-16     -15.2
1125 - 1200      1.4    5.4E-16     -15.3
1200 - 1275       .8    9.8E-16     -15
1275 - 1350     -.1     3.7E-16     -15.4
1350 - 1425     -.5     4.3E-16     -15.4
1425 - 1500     -.9     4.8E-17     -16.3
1500 - 1575     -1.5    1.6E-16     -15.8
1575 - 1650     -2      1.[illegible]E-16     -15.8
1650 - 1725     -2.7    1.8E-16     -15.8
1725 - 1800     -3.3    1.4E-16     -15.9
1800 - 1875     -4.1    1.2E-15     -14.9
1875 - 1950     -4.9    5.3E-16     -15.3
1950 - 2025     -5.3    1.2E-15     -14.9
2025 - 2100     -5.6    1.4E-17     -16.9
2100 - 2175     -6.2    4.9E-18     -17.3
2175 - 2250     -6.6    2.4E-18     -17.6
2250 - 2325     -7.3    1.3E-18     -17.9
2325 - 2400     -7.7    3.2E-18     -17.5
2400 - 2475     -7.9    9.9E-18     -17
2475 - 2550     -8      2.6E-17     -16.6
2550 - 2625     -8.3    3.[illegible]E-17     -16.[illegible]
2625 - 2700     -8.4    3E-17       -16.5
2700 - 2775     -8.5    2.8E-17     -16.5
2775 - 2850     -8.5    2E-17       -16.7
2850 - 2925     -8.4    2.1E-17     -16.7
2925 - 3000     -8.3    3.7E-18     -17.4
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WSMR        770402     1200 MST

NOISE LEVEL = .00003
IAS = 120 MPH
ALTIMETER SETTING = 29.84

HEIGHT (M AGL)    T       CN2       LOG10 CN2

 150 -  225     11      9.3E-16     -15
 225 -  300     10.1    4.2E-15     -14.4
 300 -  375      9.4    2.5E-15     -14.6
 375 -  450      8.8    8.2E-16     -15.1
 450 -  525      8.1    4.1E-16     -15.4
 525 -  600      7.5    3.2E-16     -15.5
 600 -  675      6.9    4.9E-16     -15.3
 675 -  750      6.2    1.1E-15     -14.9
 750 -  825      5.5    2.3E-16     -15.6
 825 -  900      4.8    5.1E-16     -15.3
 900 -  975      4.1    8.7E-16     -15
 975 - 1050      3.2    1.2E-16     -15.9
1050 - 1125      2.7    2.6E-16     -15.6
1125 - 1200      1.9    4.5E-16     -15.3
1200 - 1275      1.3    2.6E-16     -15.6
1275 - 1350       .3    9.8E-16     -15
1350 - 1425      -.5    7E-16       -15.2
1425 - 1500      -.8    3.1E-16     -15.5
1500 - 1575     -1.2    1.7E-16     -15.8
1575 - 1650     -1.5    4.5E-16     -15.3
1650 - 1725     -2.5    1.4E-15     -14.8
1725 - 1800     -3.3    3.9E-16     -15.4
1800 - 1875     -3.7    3.9E-15     -14.4
1875 - 1950     -4.5    4.2E-15     -14.4
1950 - 2025     -4.8    1.5E-15     -14.8
2025 - 2100     -5      5.9E-16     -15.2
2100 - 2175     -4.8    1.5E-15     -14.8
2175 - 2250     -4.4    9E-16       -15
2250 - 2325     -4      7E-16       -15.2
2325 - 2400     -3.6    3.2E-15     -14.5
2400 - 2475     -4.1    2.7E-16     -15.6
2475 - 2550     -4.4    2.8E-17     -16.6
2550 - 2625     -5.4    3.7E-17     -16.4
2625 - 2700     -6.4    2.2E-16     -15.7
2700 - 2775     -6.9    3.9E-15     -14.4
2775 - 2850     -6.5    7.6E-16     -15.1
2850 - 2925     -6.6    9.8E-17     -16
2925 - 3000     -6.7    5.1E-16     -15.3
```

WSMR 770402 1000 MST

NOISE LEVEL = 00005
IAS = 120 MPH
ALTIMETER SETTING = 29 72

HEIGHT (M AGL)	T	CN2	LOG10 CN2
150 - 225	14.9	5.2E-17	-16.3
225 - 300	14.3	4.3E-17	-16.
300 - 375	13.5	1E-16	-16
375 - 450	13	6.4E-17	-16.2
450 - 525	12.2	5.7E-17	-16.2
525 - 600	11.3	1.2E-16	-15.9
600 - 675	10.2	8.1E-17	-16.1
675 - 750	9.7	5.6E-17	-16.2
750 - 825	9	3.2E-17	-16.5
825 - 900	8.6	2.6E-17	-16.6
900 - 975	7.6	8.6E-17	-16.1
975 - 1050	7.4	3.8E-17	-16.4
1050 - 1125	6.6	8.0E-17	-16.1
1125 - 1200	5.8	9.9E-17	-16
1200 - 1275	5	3.2E-17	-16.5
1275 - 1350	4.2	5.7E-17	-16.2
1350 - 1425	3.2	5.6E-17	-16.3
1425 - 1500	2.6	8E-17	-16.1
1500 - 1575	2	3.6E-17	-16.4
1575 - 1650	1.3	9.6E-17	-16
1650 - 1725	.5	1.4E-16	-15.8
1725 - 1800	-.6	7.4E-17	-16.1
1800 - 1875	-1	1.1E-16	-16
1875 - 1950	-1.7	9.6E-17	-16
1950 - 2025	-2.3	2.4E-17	-16.6
2025 - 2100	-2.8	7.7E-17	-16.1
2100 - 2175	-3.4	8E-17	-16.1
2175 - 2250	-4.1	1.3E-16	-15.9
2250 - 2325	-4.9	2.1E-16	-15.7
2325 - 2400	-5.6	1.2E-16	-15.9
2400 - 2475	-6.2	2.2E-16	-15.7
2475 - 2550	-6.8	1.6E-16	-15.8
2550 - 2625	-7.4	3.2E-17	-16.5
2625 - 2700	-7.9	1.3E-16	-15.9
2700 - 2775	-8.4	2.5E-16	-15.6
2775 - 2850	-9.1	3.7E-16	-15.4
2850 - 2925	-9.9	9E-16	-15
2925 - 3000	-10.4	1.9E-16	-15.7

WSMR 770403 0 MST

NOISE LEVEL = .00002
IAS = 130 MPH
ALTIMETER SETTING = 29 76

HEIGHT (M AGL)	T	CN2	LOG10 CN2
225 - 300	10.9	4.5E-16	-15.3
300 - 375	10.5	5.3E-16	-15.3
375 - 450	9.8	1.6E-16	-15.8
450 - 525	8.9	1.4E-16	-15.8
525 - 600	8.5	2E-16	-15.7
600 - 675	7.8	7.4E-16	-15.1
675 - 750	7.3	4.3E-16	-15.4
750 - 825	6.8	5.6E-16	-15.3
825 - 900	6.3	3.3E-16	-15.5
900 - 975	5.7	3.6E-16	-15.4
975 - 1050	5.1	3.4E-16	-15.5
1050 - 1125	4.5	3.3E-16	-15.5
1125 - 1200	4.1	5.8E-16	-15.2
1200 - 1275	3.1	2.9E-16	-15.5
1275 - 1350	2.4	2.4E-16	-15.6
1350 - 1425	1.6	4.2E-17	-16.4
1425 - 1500	.9	2.1E-17	-16.7
1500 - 1575	-.1	1.5E-16	-15.8
1575 - 1650	-.6	1.8E-16	-15.7
1650 - 1725	-.9	9.9E-17	-16
1725 - 1800	-1.5	1.3E-16	-15.9
1800 - 1875	-2	4.2E-17	-16.4
1875 - 1950	-2.5	4E-17	-16.4
1950 - 2025	-3.2	6.8E-18	-17.2
2025 - 2100	-4	1.8E-17	-16.8
2100 - 2175	-4.7	1.5E-17	-16.8
2175 - 2250	-5.1	9.8E-18	-17
2250 - 2325	-5.7	1.5E-17	-16.8
2325 - 2400	-6.2	4.6E-17	-16.3
2400 - 2475	-6.8	4.3E-17	-16.4
2475 - 2550	-7.2	2.6E-17	-16.6
2550 - 2625	-7.3	5.8E-17	-16.2
2625 - 2700	-7.1	1.8E-16	-15.7
2700 - 2775	-7.3	7.3E-17	-16.1
2775 - 2850	-7.8	3.2E-17	-16.5
2850 - 2925	-8.4	7.7E-18	-17.1
2925 - 3000	-9.2	5.6E-18	-17.3

```
WSMR          770403     500 MST

NOISE LEVEL = 1.25E-5
IAS = 120 MPH
ALTIMETER SETTING = 30.02

HEIGHT (M AGL)     T       CN2     LOG10 CN2

225 - 300         4.8   3.4E-16    -15.5
300 - 375         4.7   1.1E-16    -16
375 - 450         4.2   1.3E-16    -15.9
450 - 525         3.4   1.4E-16    -15.8
525 - 600         2.8   3.8E-16    -15.4
600 - 675         2.1   2.5E-16    -15.6
675 - 750         1.6   5.3E-16    -15.3
750 - 825         1.1   3.5E-16    -15.5
825 - 900          .9   6.4E-16    -15.2
900 - 975         -.3   3.5E-16    -15.4
975 - 1050        -.7   9.7E-17    -16
1050 - 1125       -.7   1.4E-16    -15.9
1125 - 1200       -1    7.9E-17    -16.1
1200 - 1275       -1.3  4.3E-17    -16.4
1275 - 1350       -1.7  2.1E-16    -15.7
1350 - 1425       -2.1  1.3E-15    -14.9
1425 - 1500       -2.6  2.8E-16    -15.6
1500 - 1575       -2.9  1.6E-16    -15.8
1575 - 1650       -3.3  4.3E-16    -15.4
1650 - 1725       -3.8  1.2E-16    -15.9
1725 - 1800       -4.1  2.4E-16    -15.6
1800 - 1875       -4.6  2.3E-16    -15.6
1875 - 1950       -5    1.3E-16    -15.9
1950 - 2025       -5.6  8.1E-17    -16.1
2025 - 2100       -6    2.9E-17    -16.5
2100 - 2175       -6.5  2.5E-18    -17.6
2175 - 2250       -6.8  6.2E-18    -17.2
2250 - 2325       -7.1  9.6E-17    -16
2325 - 2400       -7.8  1.7E-16    -15.8
2400 - 2475       -8.1  2.7E-17    -16.6
2475 - 2550       -8.1  1.6E-17    -16.8
2550 - 2625       -8.1  6.4E-17    -16.2
2625 - 2700       -8.5  2E-17      -16.7
2700 - 2775       -9    2.7E-17    -16.5
2775 - 2850       -9.5  2.5E-17    -16.6
2850 - 2925       -9.8  4.3E-17    -16.4
2925 - 3000       -10.3 2.2E-16    -15.7
```

```
WSMR          770404     500 MST

NOISE LEVEL = .000025
IAS = 125 MPH
ALTIMETER SETTING = 29.97

HEIGHT (M AGL)     T       CN2     LOG10 CN2

225 - 300         4.1   9.3E-18    -17
300 - 375         3.8   1.7E-16    -15.8
375 - 450         3.5   1.6E-16    -15.8
450 - 525         3.1   6.2E-17    -16.2
525 - 600         2.5   4.3E-17    -16.4
600 - 675         2     2.6E-17    -16.6
675 - 750         1.4   2.9E-17    -16.5
750 - 825         1     5.6E-17    -16.3
825 - 900         -.6   1.8E-17    -16.7
900 - 975         -.6   1.7E-17    -16.8
975 - 1050        -.9   3E-17      -16.5
1050 - 1125       -1.7  1.5E-17    -16.8
1125 - 1200       -2.4  2.2E-17    -16.7
1200 - 1275       -3.2  2.9E-17    -16.5
1275 - 1350       -3.7  3.2E-17    -16.5
1350 - 1425       -4.4  4.1E-17    -16.4
1425 - 1500       -4.9  4.7E-17    -16.3
1500 - 1575       -5.4  4.5E-17    -16.3
1575 - 1650       -5.8  4.1E-17    -16.4
1650 - 1725       -6.3  4.1E-17    -16.4
1725 - 1800       -6.7  1.7E-16    -15.8
1800 - 1875       -7.2  1.4E-16    -15.9
1875 - 1950       -7.7  1.4E-17    -16.9
1950 - 2025       -8.1  4.7E-17    -16.3
2025 - 2100       -8.4  3.3E-16    -15.5
2100 - 2175       -8.7  7.5E-17    -16.1
2175 - 2250       -9.1  10E-18     -17
2250 - 2325       -9.5  1.2E-17    -16.9
2325 - 2400       -9.7  1.1E-17    -17
2400 - 2475       -9.5  4.8E-17    -16.3
2475 - 2550       -10   7E-17      -16.2
2550 - 2625       -10.6 1.7E-18    -17.8
2625 - 2700       -10.9 4.5E-18    -17.3
2700 - 2775       -11.2 2.1E-17    -16.7
2775 - 2850       -11.5 8E-17      -16.1
2850 - 2925       -12   1.7E-17    -16.8
2925 - 3000       -12.5 7.4E-18    -17.1
```

WSMR 770404 1200 MST

NOISE LEVEL = .000063
IAS = 120 MPH
ALTIMETER SETTING = 30.07

HEIGHT (M AGL)	T	CN2	LOG10 CN2
0 - 75	10.6	6.3E-15	-14.2
75 - 150	10	4.3E-15	-14.4
150 - 225	9.2	1.2E-15	-14.9
225 - 300	8.6	4E-15	-14.4
300 - 375	7.9	1.8E-15	-14.7
375 - 450	7	6.6E-16	-15.2
450 - 525	6.1	5.4E-16	-15.3
525 - 600	5.5	3.2E-16	-15.5
600 - 675	4.8	3.5E-16	-15.5
675 - 750	4.2	3.6E-16	-15.4
750 - 825	3.5	5.9E-16	-15.2
825 - 900	2.8	1.3E-15	-14.9
900 - 975	2.2	1.7E-15	-14.8
975 - 1050	1.7	5.5E-16	-15.3
1050 - 1125	1.3	1.3E-15	-14.9
1125 - 1200	1	4.3E-16	-15.4
1200 - 1275	-.5	2.3E-16	-15.6
1275 - 1350	-.6	4.1E-15	-14.4
1350 - 1425	-1	8.7E-16	-15.1
1425 - 1500	-1.4	3.2E-16	-15.5
1500 - 1575	-1.9	1.9E-16	-15.7
1575 - 1650	-2.1	1.1E-16	-16
1650 - 1725	-2.4	8.6E-17	-16.1
1725 - 1800	-2.7	2E-16	-15.7
1800 - 1875	-3	1.6E-15	-14.8
1875 - 1950	-3.1	4.6E-15	-14.3
1950 - 2025	-3.3	8.5E-17	-16.1
2025 - 2100	-3.8	3.4E-17	-16.5
2100 - 2175	-4.3	6E-17	-16.2
2175 - 2250	-4.6	5.1E-17	-16.3
2250 - 2325	-4.9	1E-16	-16
2325 - 2400	-5.4	6E-17	-16.2
2400 - 2475	-6	1.9E-16	-15.7
2475 - 2550	-6.3	1.1E-16	-16
2550 - 2625	-6.6	5.3E-16	-15.3
2625 - 2700	-7	8.5E-17	-16.1
2700 - 2775	-7.7	1.2E-16	-15.9
2775 - 2850	-8.1	3.5E-16	-15.5
2850 - 2925	-8.3	1.3E-16	-15.9
2925 - 3000	-8.5	1.2E-17	-16.9

WSMR 770404 1000 MST

NOISE LEVEL = .000025
IAS = 120 MPH
ALTIMETER SETTING = 30.02

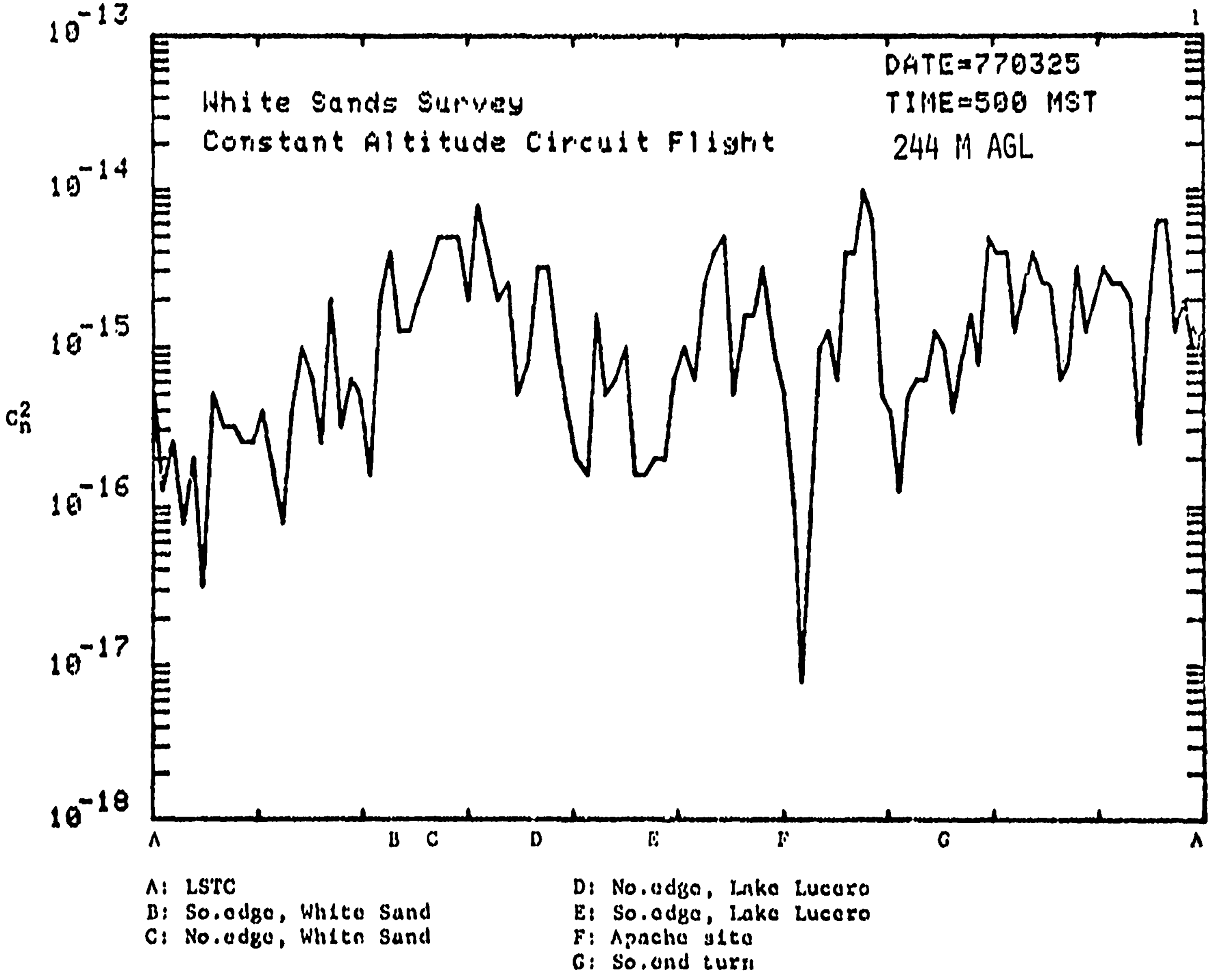
HEIGHT (M AGL)	T	CN2	LOG10 CN2
0 - 75	15.7	5.9E-17	-16.2
75 - 150	15	1.7E-17	-16.8
150 - 225	14.2	1.3E-17	-16.9
225 - 300	13.6	2.6E-17	-16.6
300 - 375	12.9	2.7E-17	-16.6
375 - 450	12.3	7.7E-17	-16.1
450 - 525	11.6	1.4E-16	-15.8
525 - 600	11	5.1E-17	-16.3
600 - 675	10.4	6.8E-17	-16.2
675 - 750	9.9	3.7E-16	-15.4
750 - 825	9.2	1.9E-16	-15.7
825 - 900	8.6	1.6E-16	-15.8
900 - 975	7.9	1.8E-16	-15.8
975 - 1050	7.4	1.1E-16	-16
1050 - 1125	6.6	1.5E-16	-15.8
1125 - 1200	6.1	1.1E-16	-15.9
1200 - 1275	5.3	4.5E-17	-16.4
1275 - 1350	4.7	6.3E-17	-16.2
1350 - 1425	4	1.6E-17	-16.8
1425 - 1500	3.4	2E-17	-16.7
1500 - 1575	2.8	2.5E-17	-16.6
1575 - 1650	2.2	2.1E-17	-16.7
1650 - 1725	1.5	4E-17	-16.4
1725 - 1800	.8	3.8E-17	-16.4
1800 - 1875	-.7	1.5E-16	-15.8
1875 - 1950	-.7	9.8E-17	-16
1950 - 2025	-.9	7.3E-17	-16.1
2025 - 2100	-1.3	1E-16	-16
2100 - 2175	-1.8	4.1E-16	-15.4
2175 - 2250	-2.4	1.9E-16	-15.7
2250 - 2325	-3.2	3.7E-16	-15.4
2325 - 2400	-3.4	8.9E-17	-16
2400 - 2475	-3.5	1.7E-16	-15.8
2475 - 2550	-3.6	2.4E-16	-15.6
2550 - 2625	-3.5	2.9E-16	-15.5
2625 - 2700	-3.6	2.2E-16	-15.7
2700 - 2775	-3.8	2.6E-16	-15.6
2775 - 2850	-4.1	3.2E-17	-16.5
2850 - 2925	-4.4	7.5E-17	-16.1
2925 - 3000	-4.8	6.2E-17	-16.2

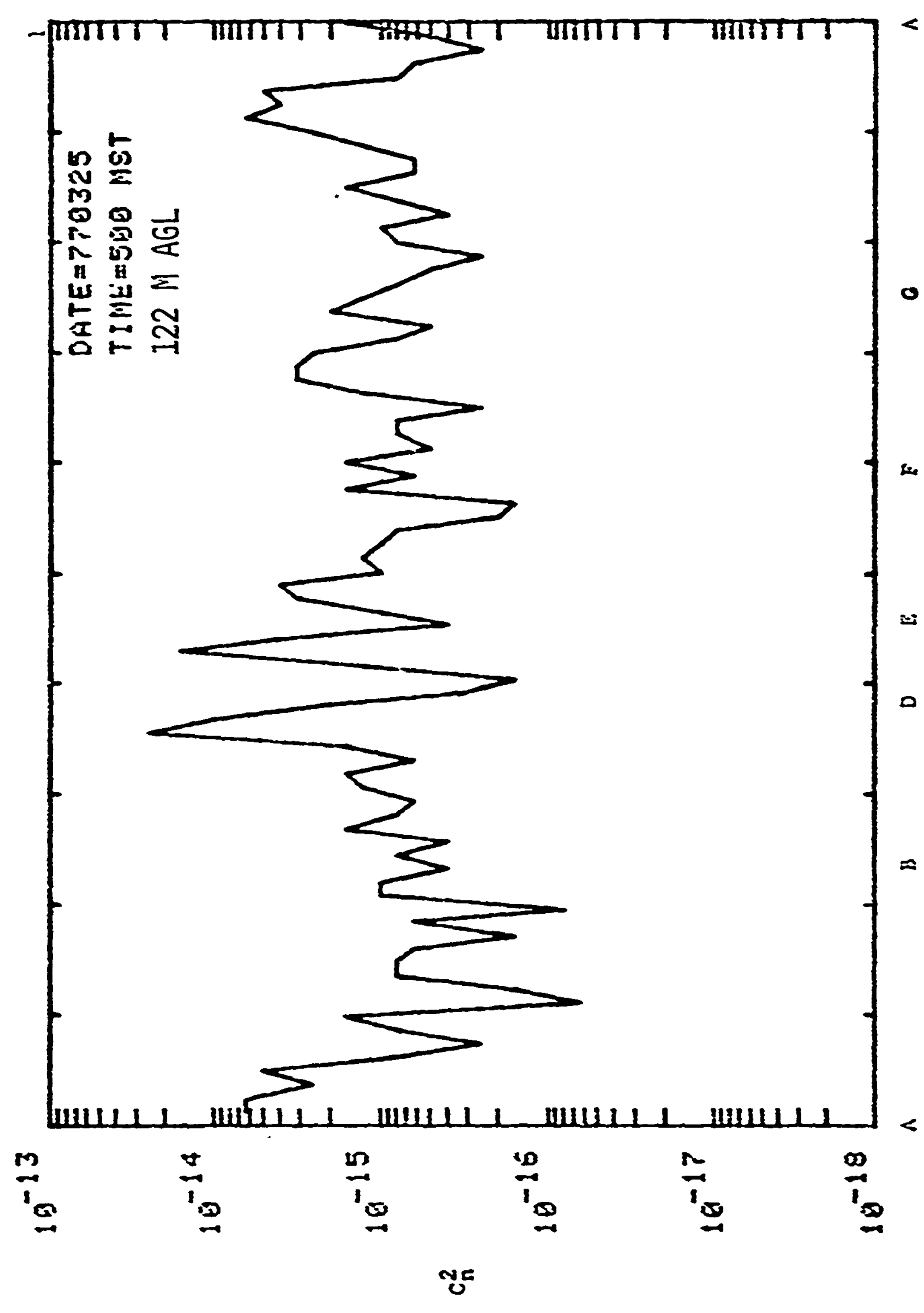
```
WOMR         770405     0 MB)

NOISE LEVEL =  000032
IAS = 125 MPH
ALTIMETER SETTING = 30 12


HEIGHT (M AGL)    T       CN2     LOG10 CN2

225 - 300        13 3   2E-15       -14 7
300 - 375        12 9   4.5E-16     -15 3
375 - 450        12 4   5.8E-17     -16.2
450 - 525        11.8   9.1E-16     -15
525 - 600        11 3   3.1E-16     -15 5
600 - 675        10 6   2.7E-16     -15.6
675 - 750        9.9    9.1E-17     -16
750 - 825        9 1    1.2E-16     -15.9
825 - 900        8.5    5.4E-17     -16.3
900 - 975        7.9    1 1E-16     -16
975 - 1050       7.3    8.9E-17     -16.1
1050 - 1125      6.5    2.7E-17     -16.6
1125 - 1200      5.9    4.6E-17     -16.3
1200 - 1275      5.2    8.9E-17     -16.1
1275 - 1350      4.6    4.1E-17     -16.4
1350 - 1425      4      2.9E-17     -16.5
1425 - 1500      3.3    5.5E-18     -17.3
1500 - 1575      2.7    9.2E-18     -17
1575 - 1650      2      5.1E-17     -16.3
1650 - 1725      1.4    2.6E-17     -16 6
1725 - 1800      .9     3.6E-17     -16.4
1800 - 1875     -.4     2.7E-17     -16.6
1875 - 1950     -.6     7 3E-18     -17.1
1950 - 2025     -1      7.8E-18     -17.1
2025 - 2100     -1.5    1.2E-17     -16.9
2100 - 2175     -2      1.3E-17     -16.9
2175 - 2250     -2.5    2.4E-17     -16 6
2250 - 2325     -3.1    2.9E-18     -17.5
2325 - 2400     -3.4    5.7E-18     -17.2
2400 - 2475     -3.7    7.5E-18     -17.1
2475 - 2550     -3.6    3.7E-18     -17 4
2550 - 2625     -3 1    7E-18       -17 2
2625 - 2700     -2.4    2.5E-16     -15.6
2700 - 2775     -1 8    3E-16       -15.5
2775 - 2850     -1.3    1.9E-16     -15.7
2850 - 2925     -1 2    8.5E-17     -16.1
2925 - 3000     -1 3    5.9E-18     -17.2
```

White Sands C_n^2 Survey Constant Altitude Flights, Log average C_n^2

Date	Time	Flight	0000			0500			1200			1800		
Mar-Apr	MST		61 m AGL	122 m	244 m	61 m AGL	122 m	244 m	61 m AGL	122 m	244 m	61 m AGL	122 m	244 m
25	0500	1				-14.3	-14.7	-14.8						
25	1000	2							-14.3	-14.7	-15.1			
25	1800	3										-15.4	-15.6	-15.5
26	0000	4		-15.1	-15.2									
26	1200	6							-14.2	-14.4	-14.9			
27	0000	8		-15.0	-15.3									
27	0500	9					-15.1	-15.0						
28	1800	15										-15.4	-15.7	Ø
29	0000	16		-14.6	-15.0									
29	0500	17				-14.9	-15.3	Ø						
29	1200	18							-14.2	-14.6	Ø			
29	1800	19										-15.5	Ø	-15.3
30	0000	20		-15.1	-15.5									
30	0500	21				-15.5	-15.1	-15.5						
30	1700	22							-14.2	-14.5	-14.7			
30	1800	23										-15.3	-15.9	-15.8
31	0000	24		-15.1	-15.2									
31	0500	25				Ø	-15.1	-15.1						
31	1100	26							-14.1	Ø	Ø			
31	1830	27										-15.0	-15.4	-15.6
01	1800	31										-15.6	-15.7	-15.7
02	0000	32		-14.9	-15.0									
02	1200	34							-14.0	-14.3	-14.6			
02	1800	35										-15.9	-15.2	-15.3
03	0000	36	-15.0	-15.1	-15.4									
03	0500	37					-15.5	-15.5						
03	1200	38							-14.1	-14.4	-14.8			
03	1800	39										-15.4	-15.6	-15.5
04	0500	41				-15.2	-15.6	-16.1						
04	1200	42							-14.2	-14.4	-14.7			
04	1800	43										-16.5	-16.7	-16.7
05	0000	44		-14.9	-15.1									

Ø : Aircraft radio interference


White Sands Survey
Constant Altitude Circuit Flight
DATE=770325
TIME=500 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
1
A
B
C
D
E
F
G
A
A: LSTC
B: So.edge, White Sand
C: No.edge, White Sand
D: No.edge, Lake Lucero
E: So.edge, Lake Lucero
F: Apache site
G: So.end turn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122 M AGL
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10^{-14}
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10^{-16}
10^{-17}
10^{-18}
C_n^2
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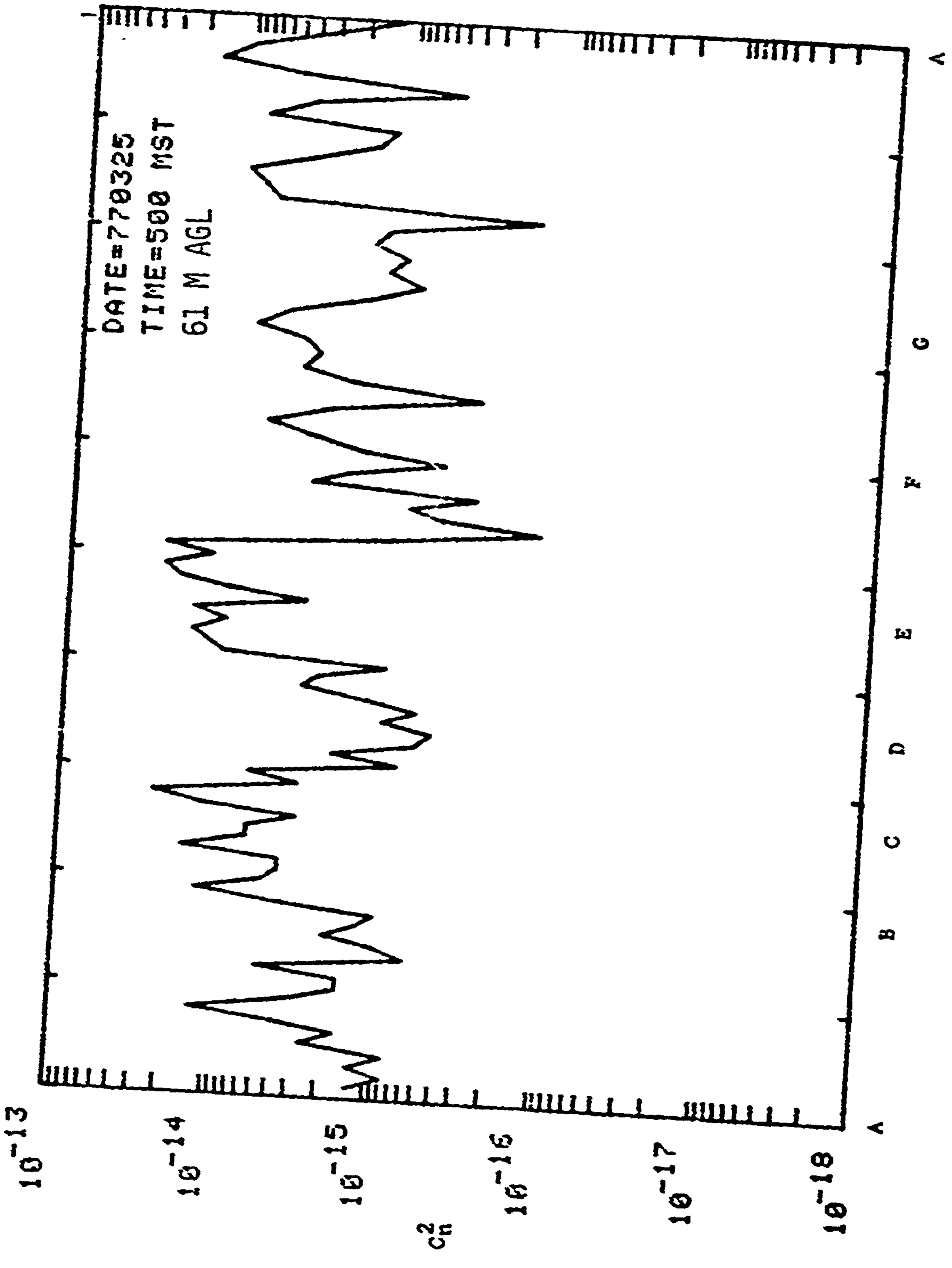
B
D
E
F
G
A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10^{-16}
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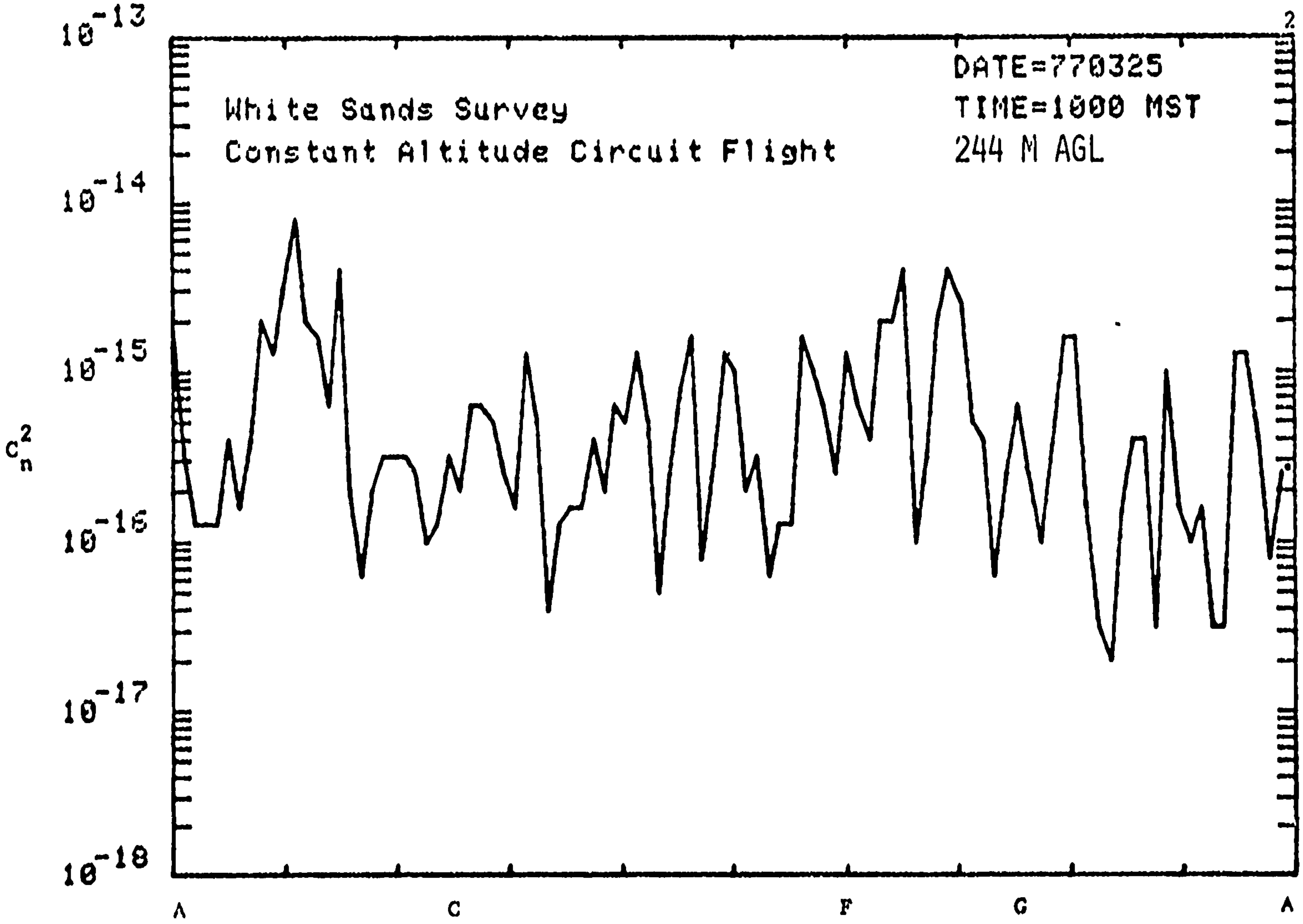
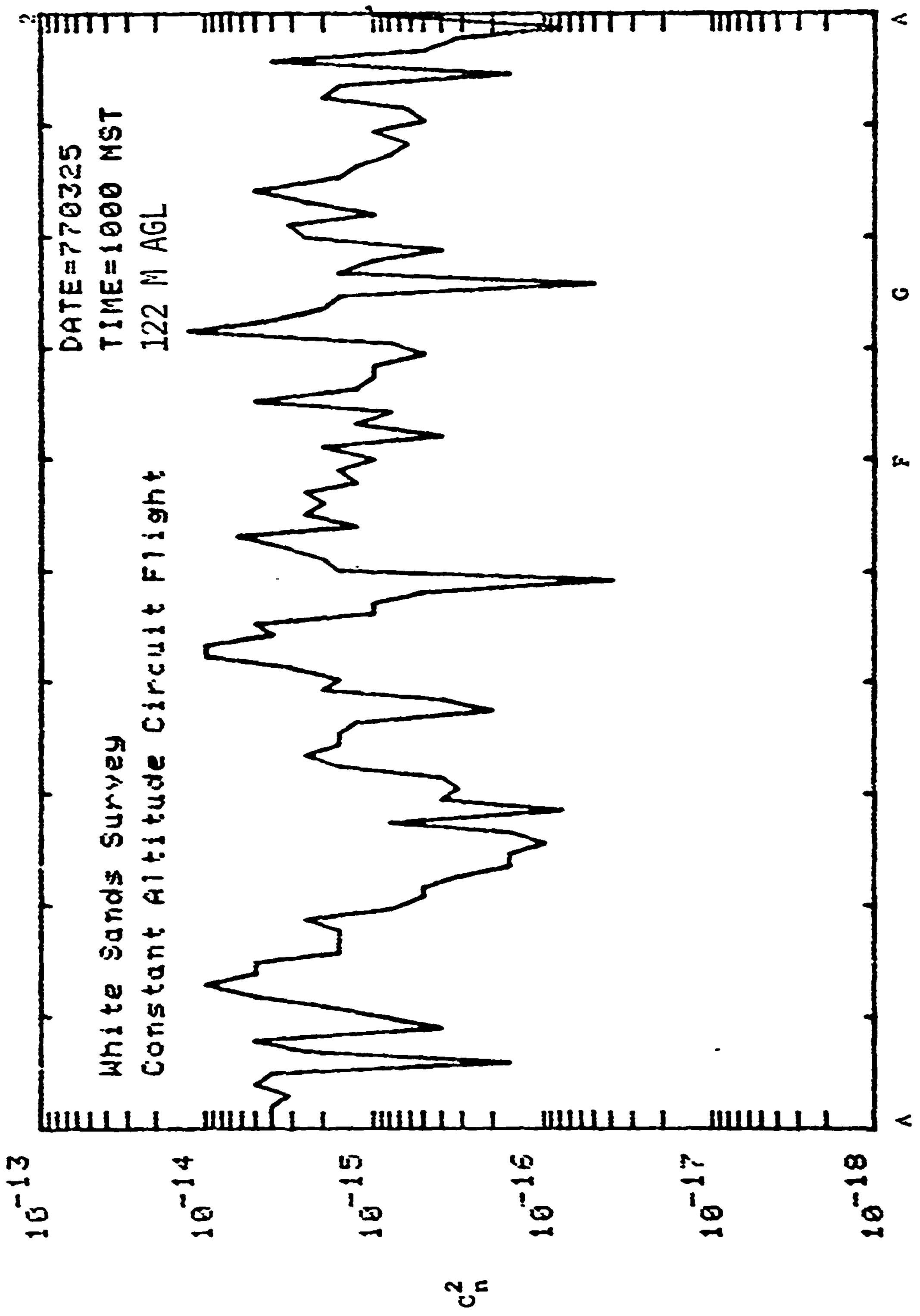
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770325
TIME=1000 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
C
F
G
A
2


White Sands Survey
Constant Altitude Circuit Flight
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TIME=1000 MST
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10^{-14}
10^{-15}
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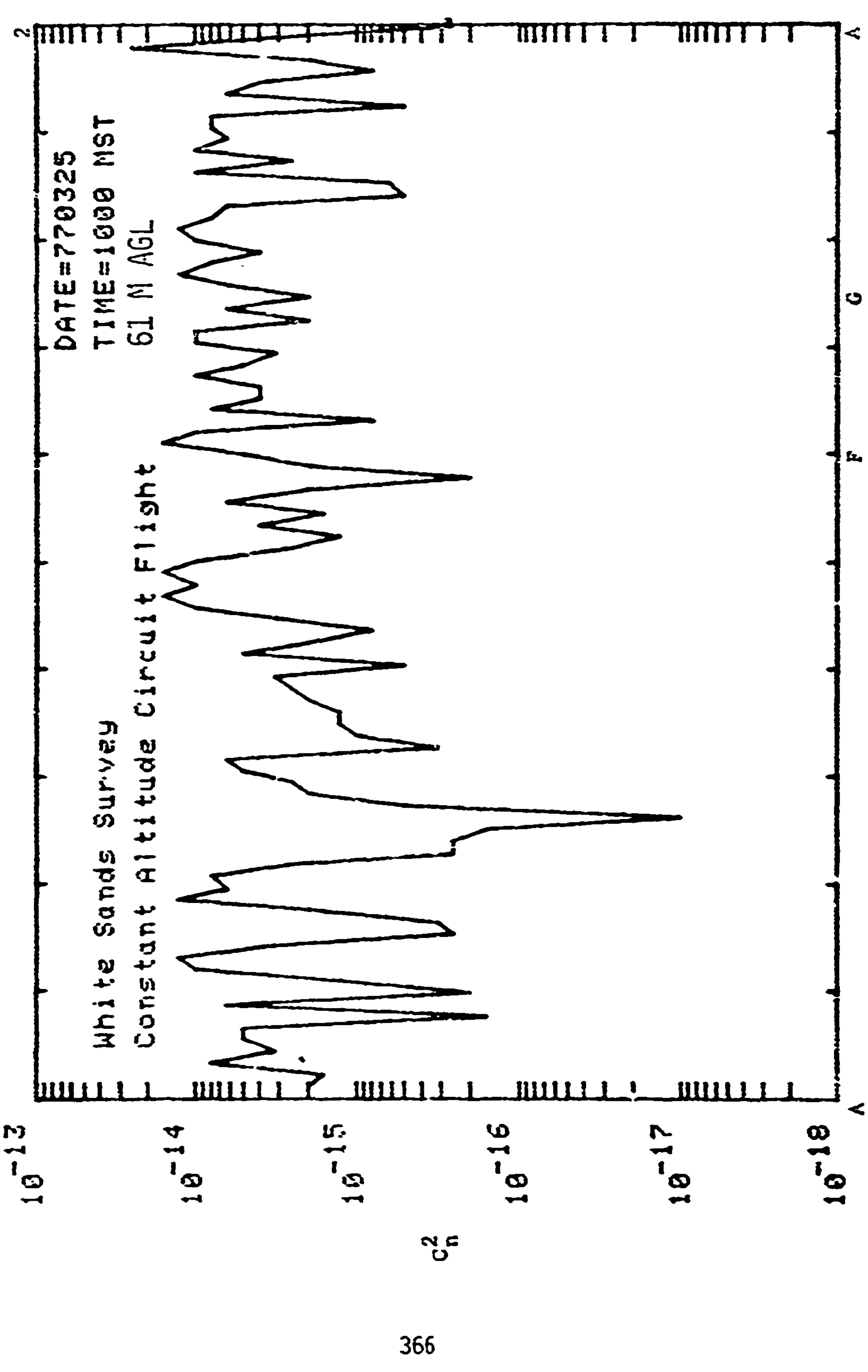
10^{-18}
A
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770325
TIME=1000 MST
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10^{-14}
10^{-15}
10^{-16}
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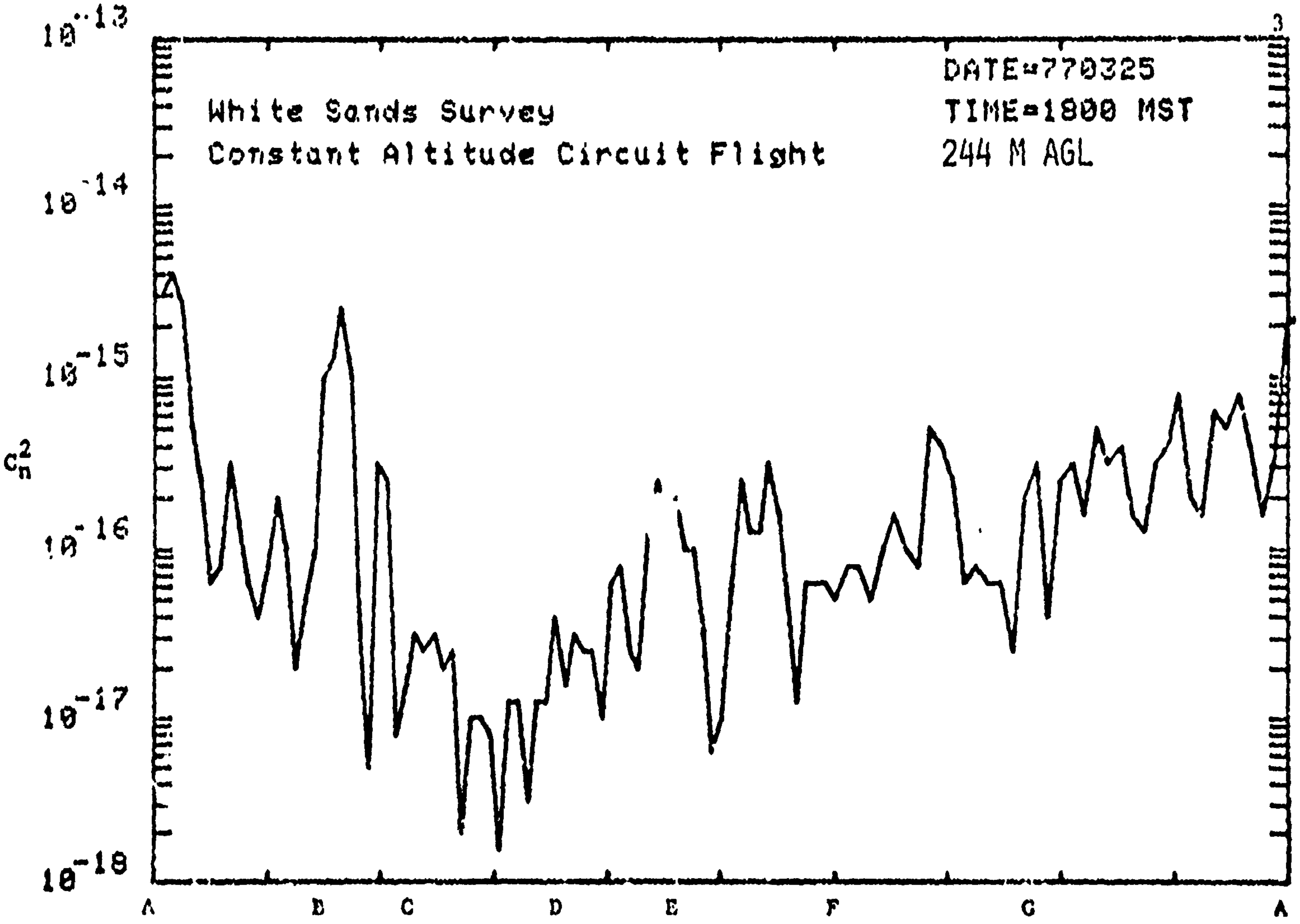
10^{-18}
C_n^2
A
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770325
TIME=1800 MST
244 M AGL
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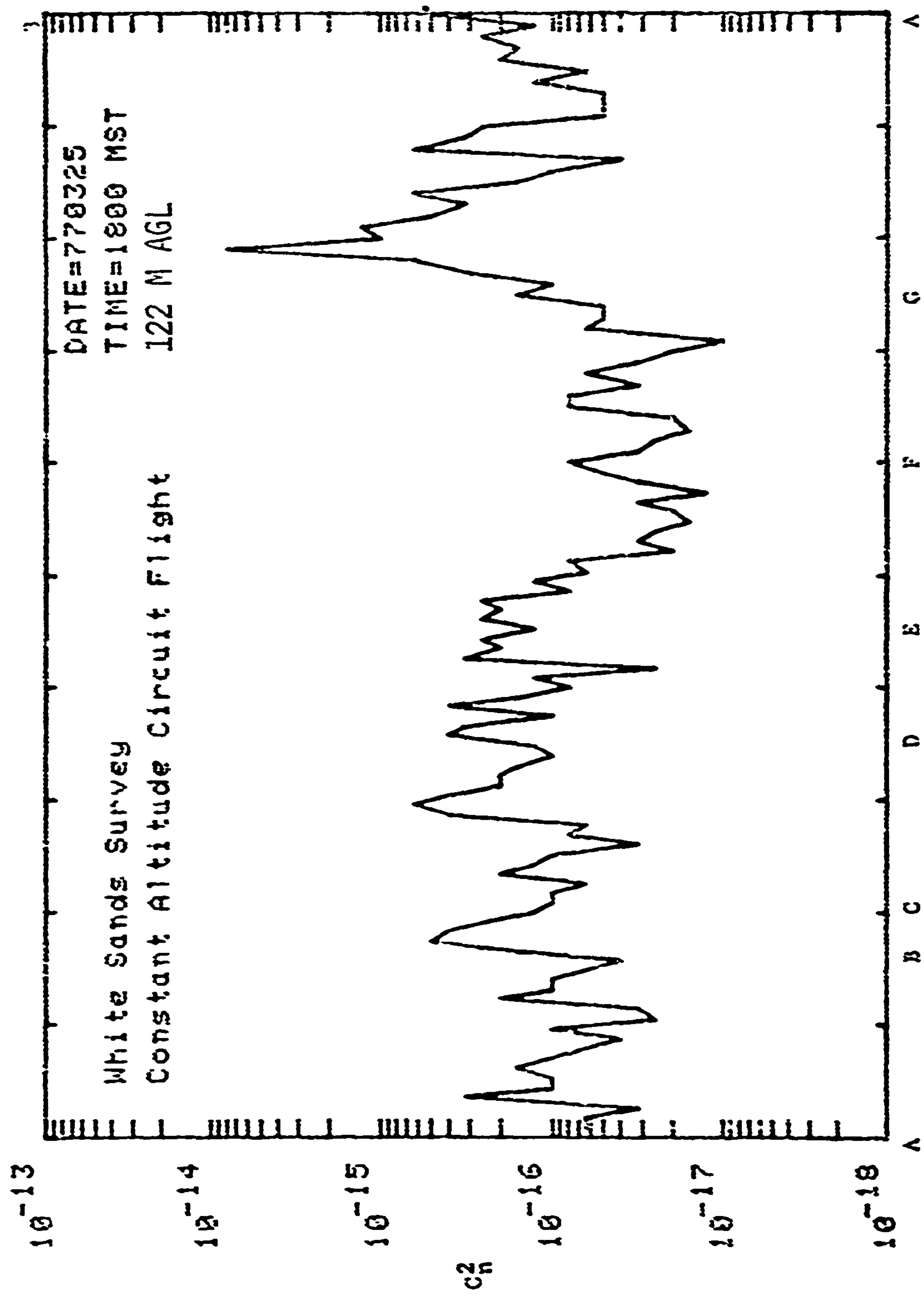
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770325
TIME=1800 MST
122 M AGL
10^{-13}
10^{-14}
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10^{-16}
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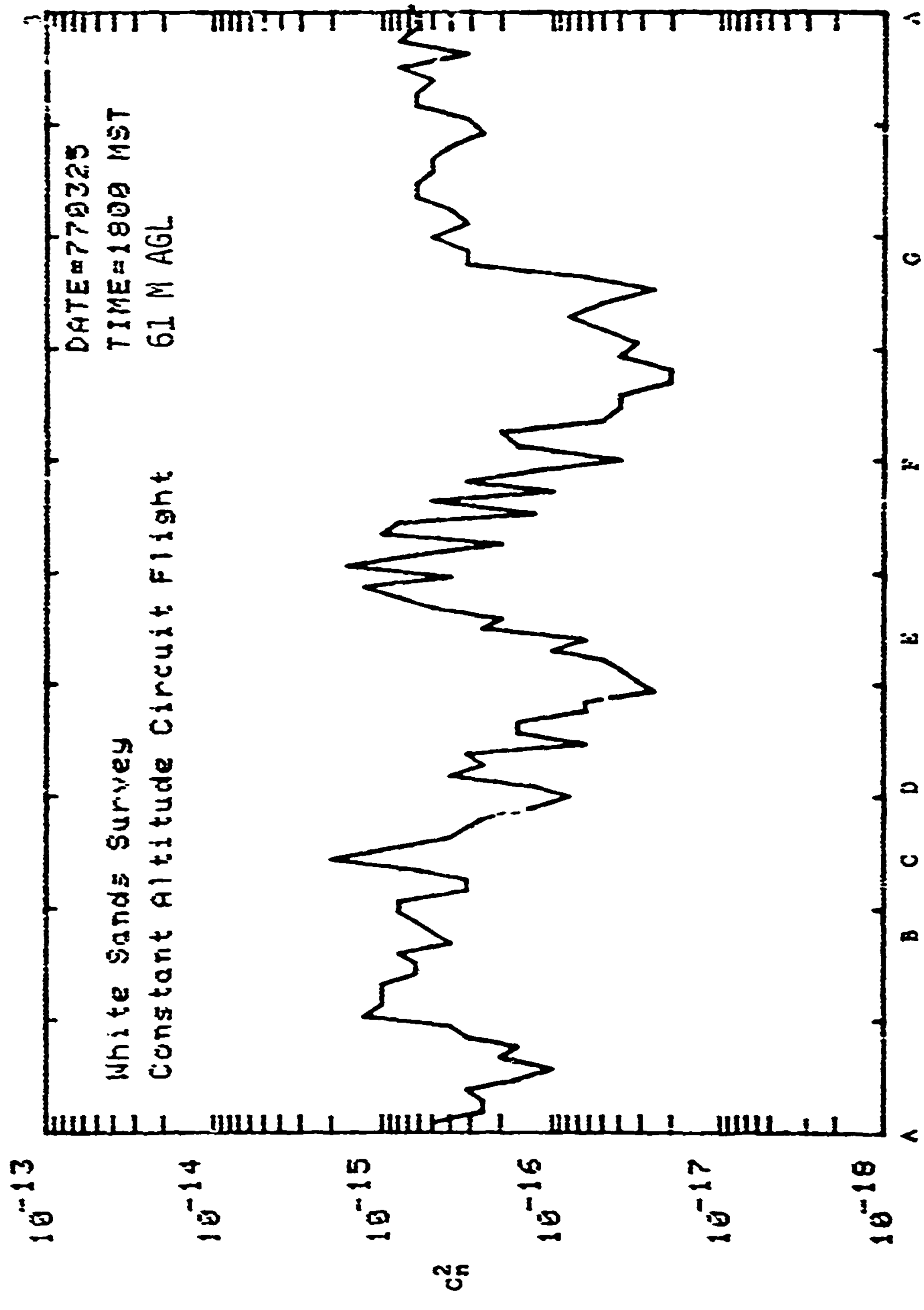
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
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TIME=1800 MST
61 M AGL
10^{-13}
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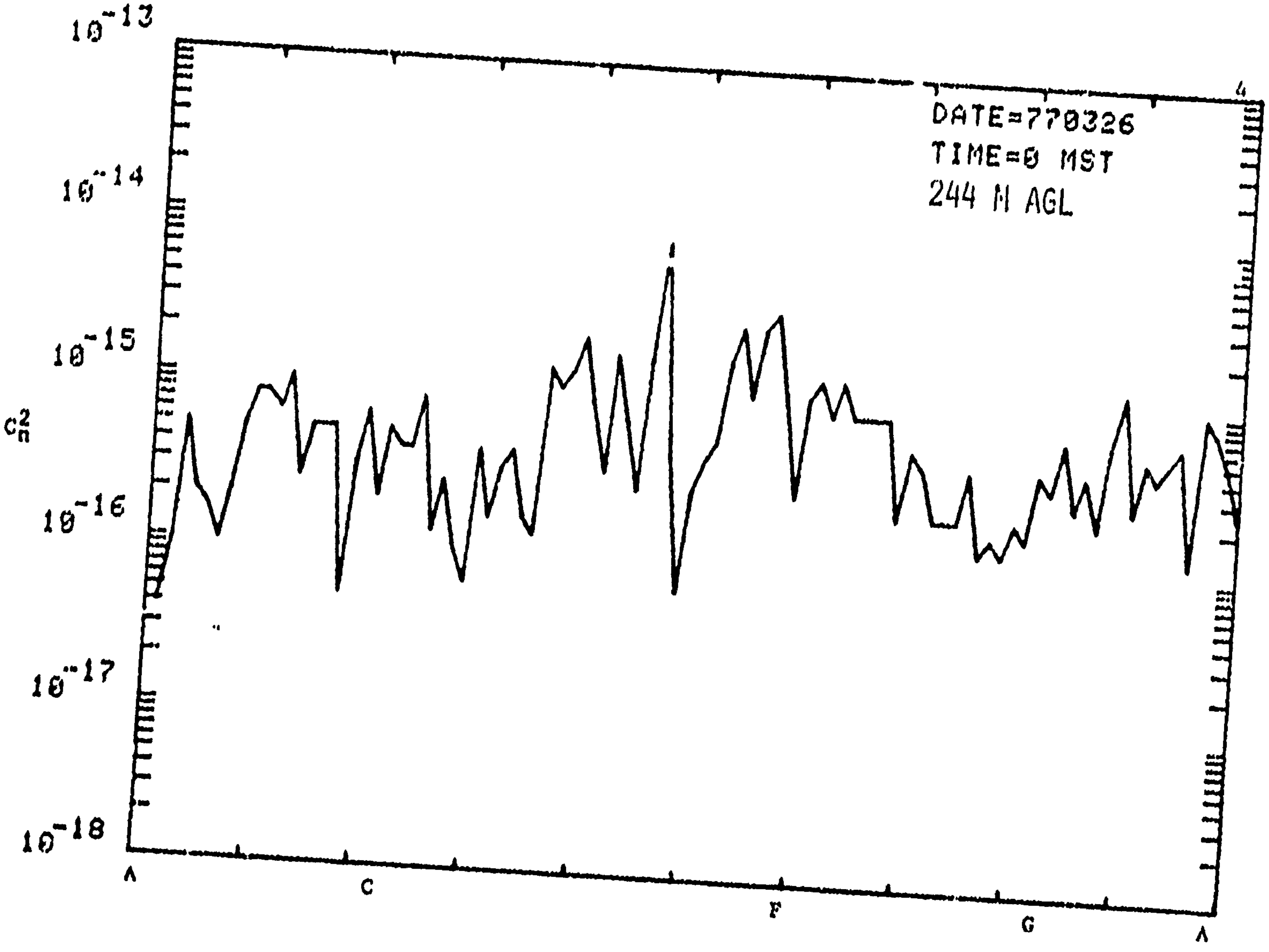
C
D
E
F
G
A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TIME=0 MST
244 M AGL
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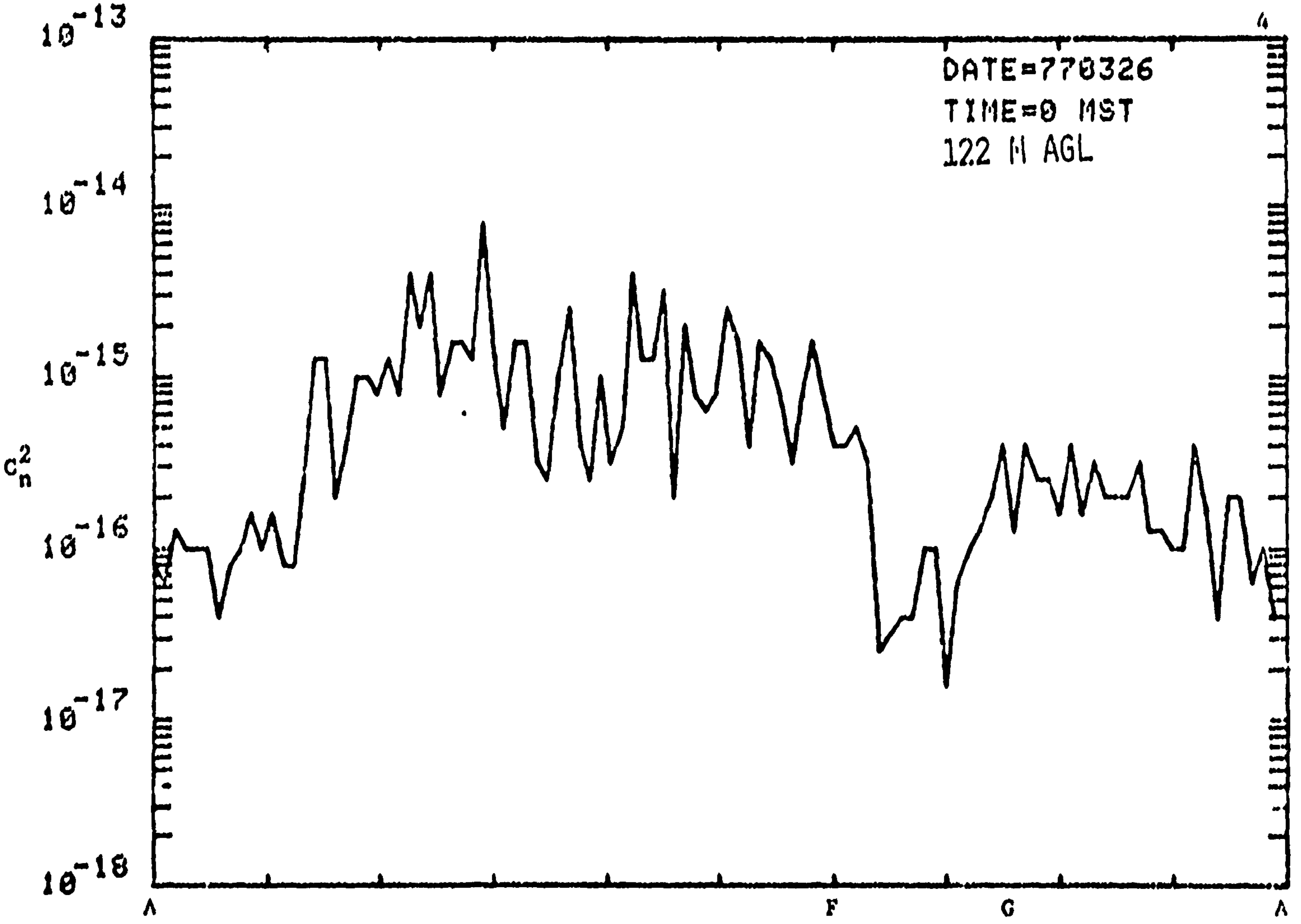
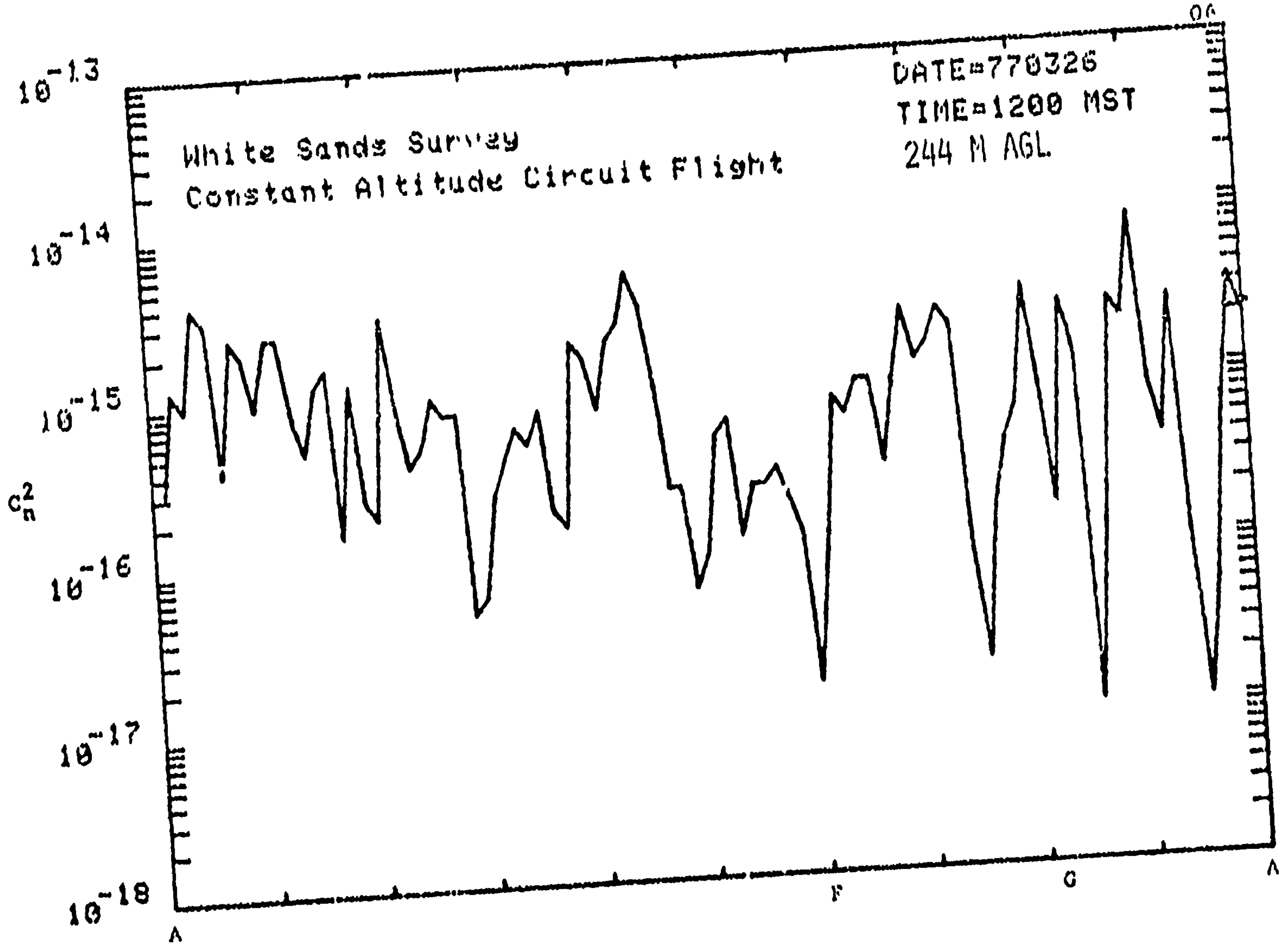
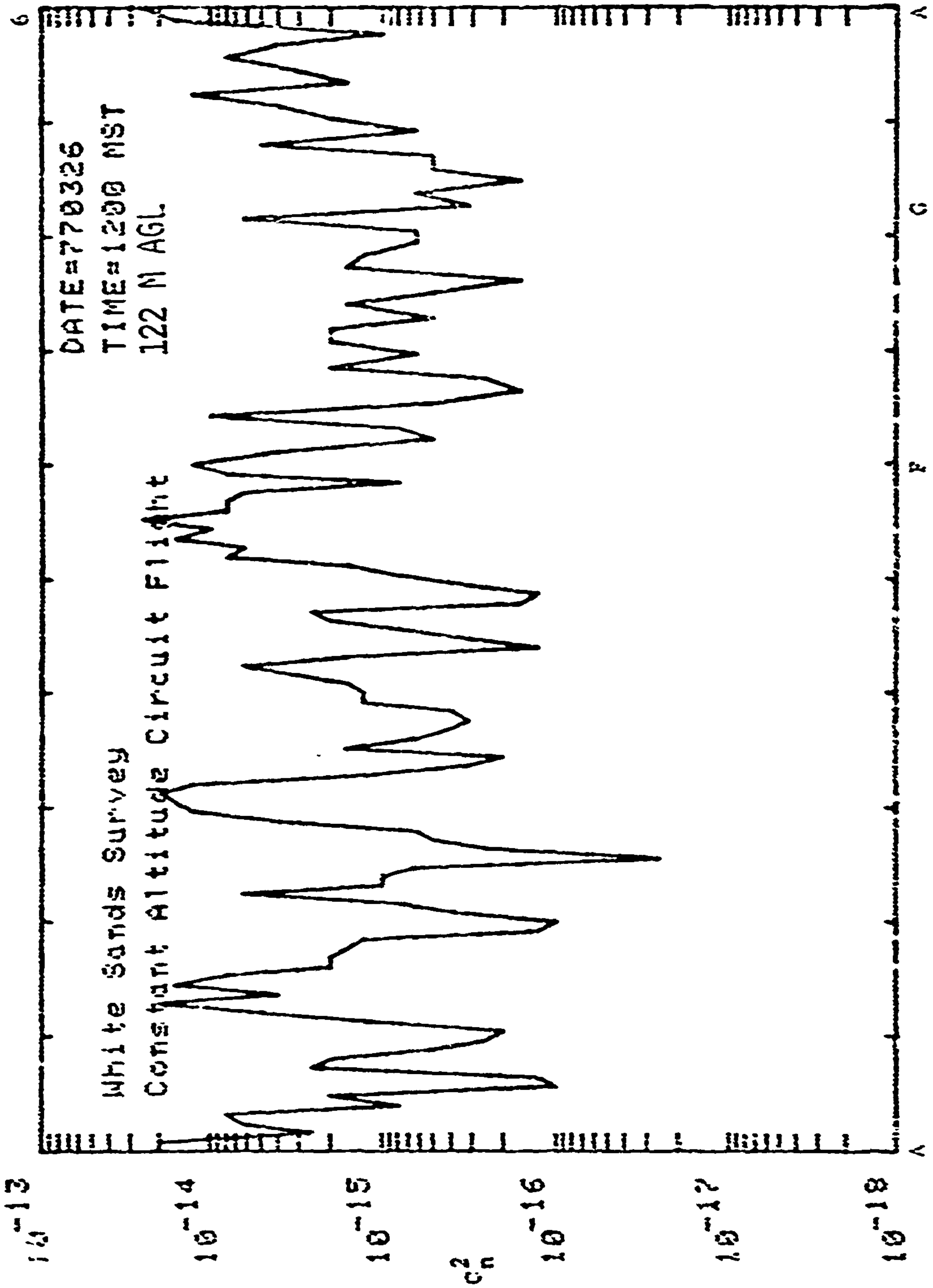
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
C
F
G
A
4


DATE=770326
TIME=0 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
F
G
A
4


White Sands Survey
Constant Altitude Circuit Flight
DATE=770326
TIME=1200 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
c_n^2
10^{-16}
10^{-17}
10^{-18}
A
F
G
A
OA


White Sands Survey
Constant Altitude Circuit Flight
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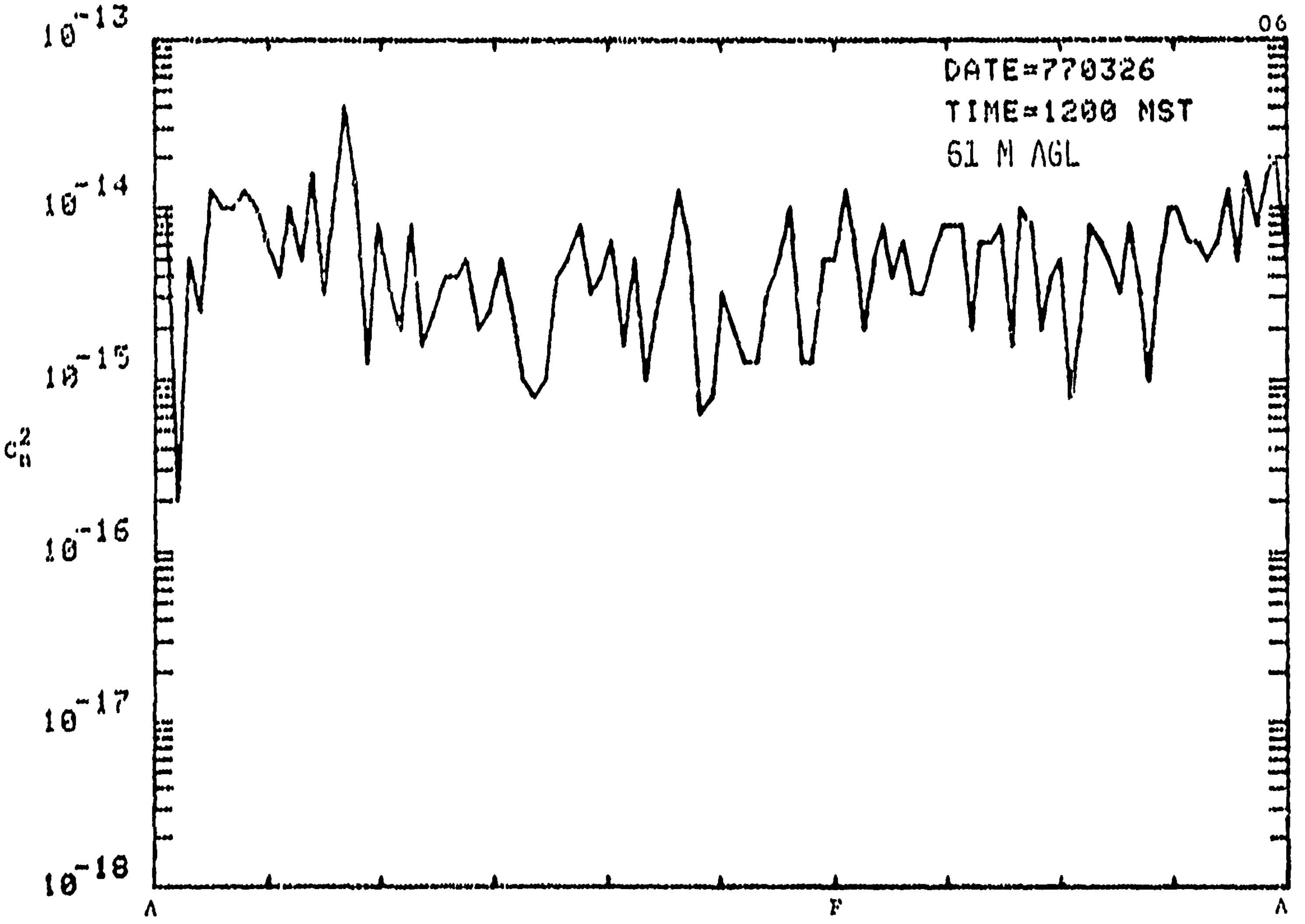
TIME=1200 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}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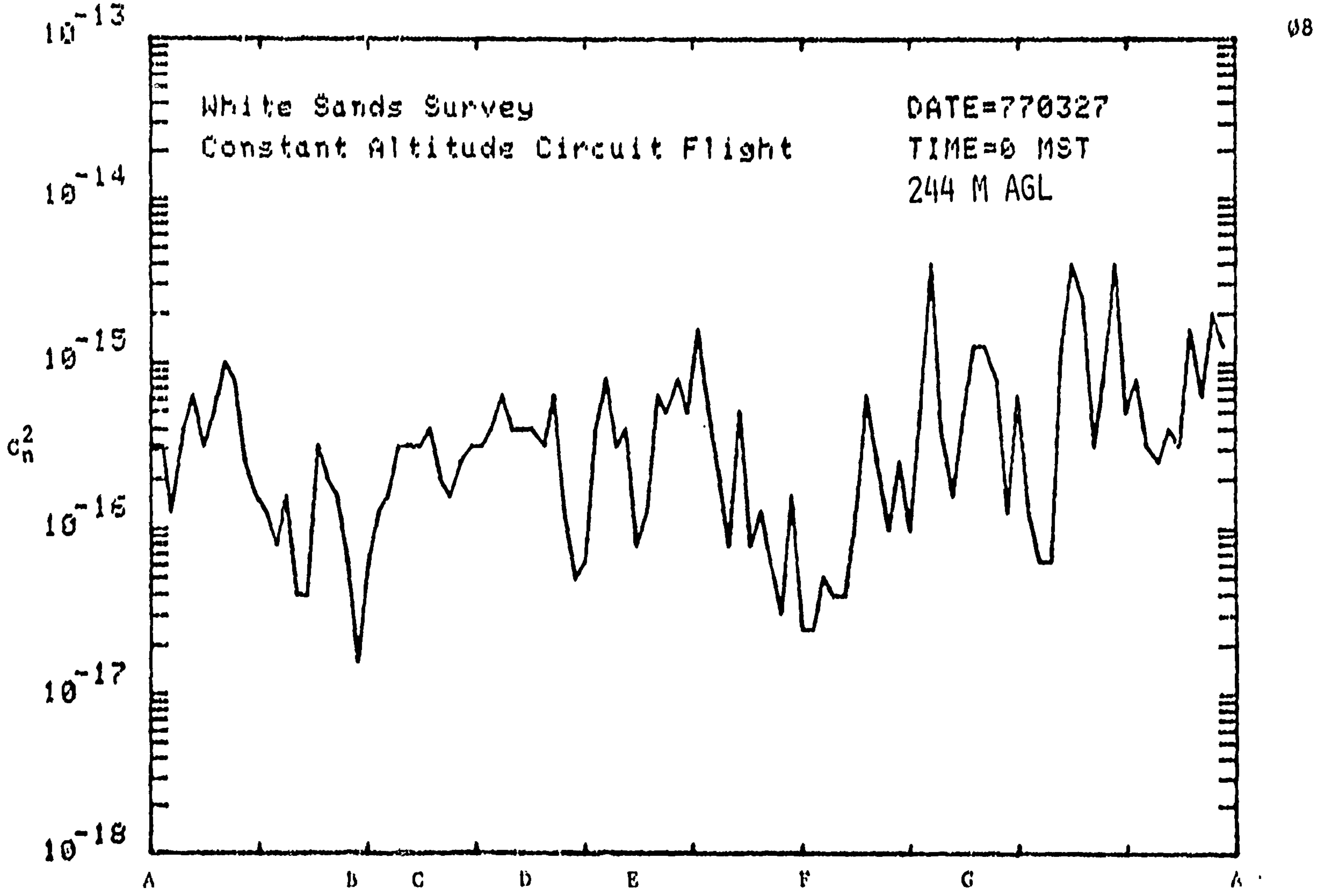
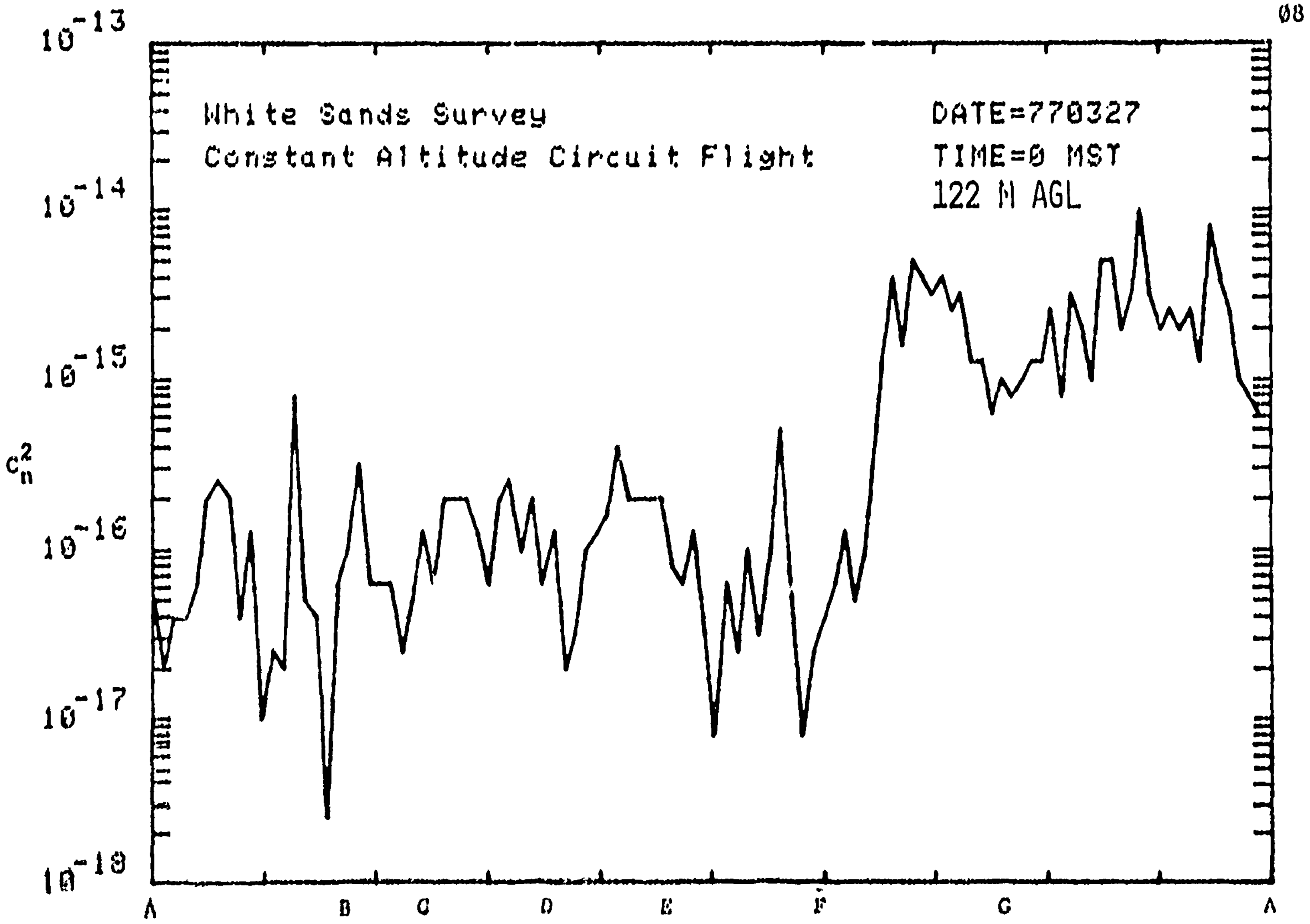
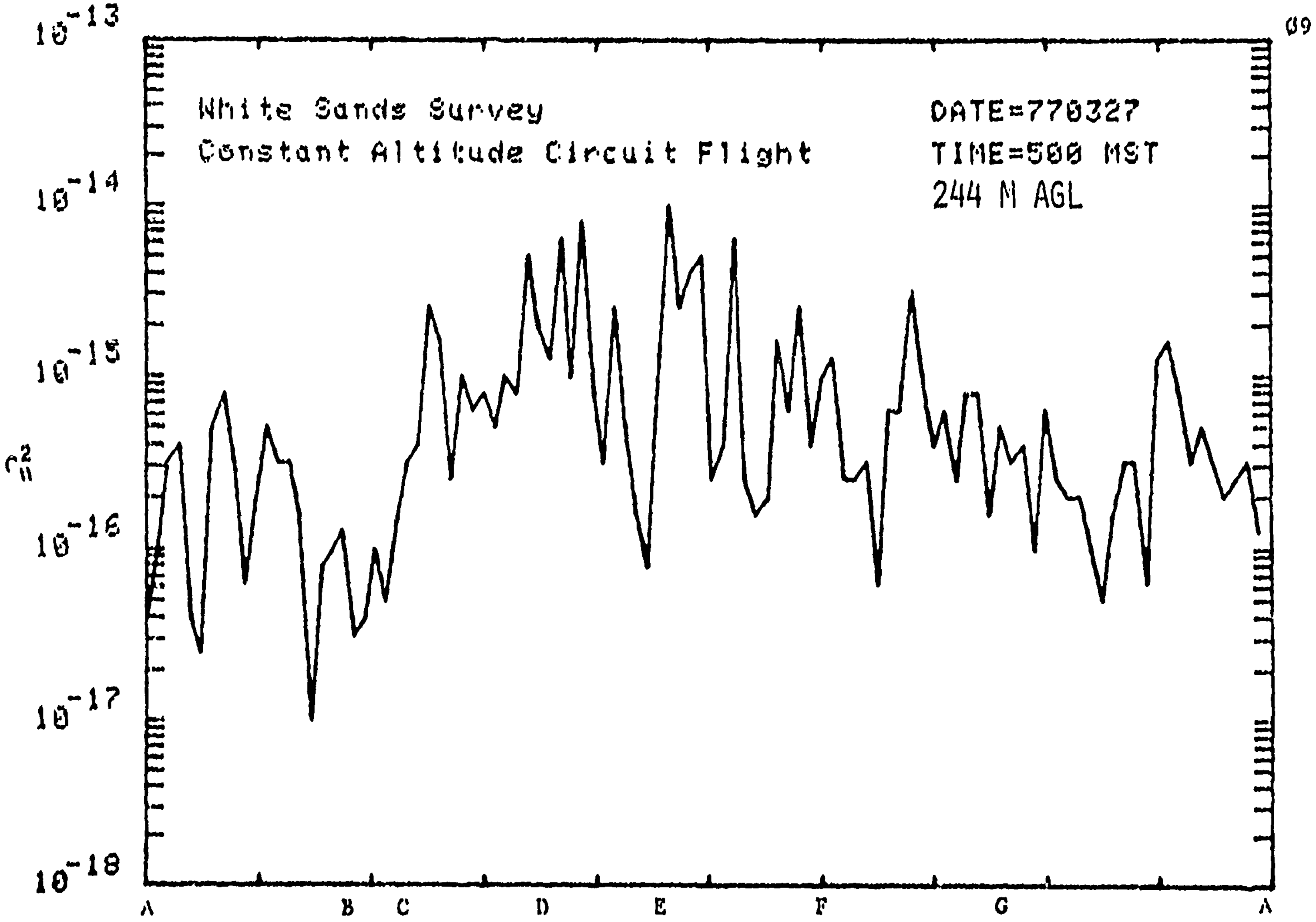
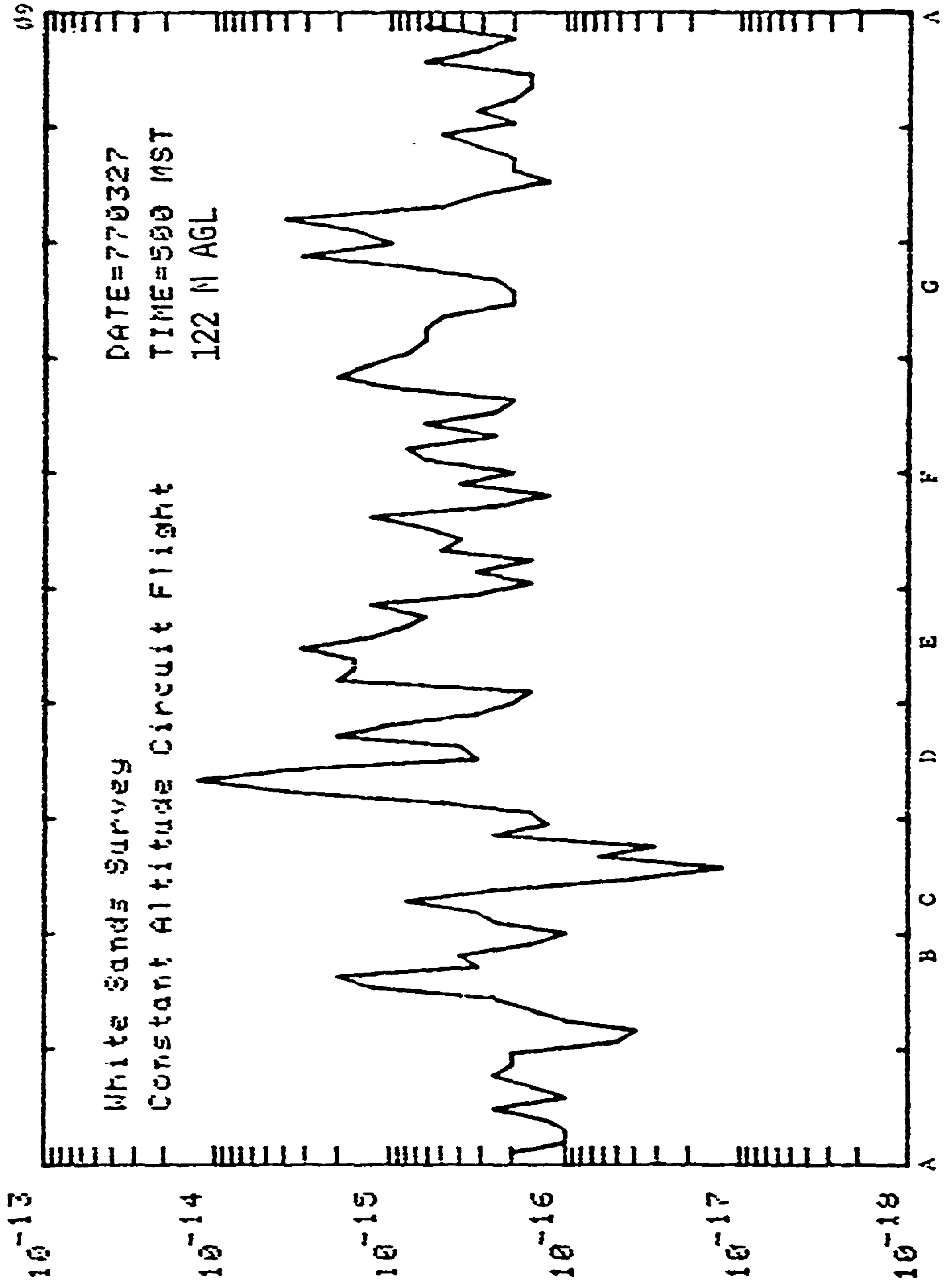
TIME=1200 MST
61 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
06
A
F
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770327
TIME=0 MST
244 M AGL
08
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770327
TIME=0 MST
122 M AGL
08
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
B
C
D
E
F
G
A


09
White Sands Survey
Constant Altitude Circuit Flight
DATE=770327
TIME=500 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770327
TIME=500 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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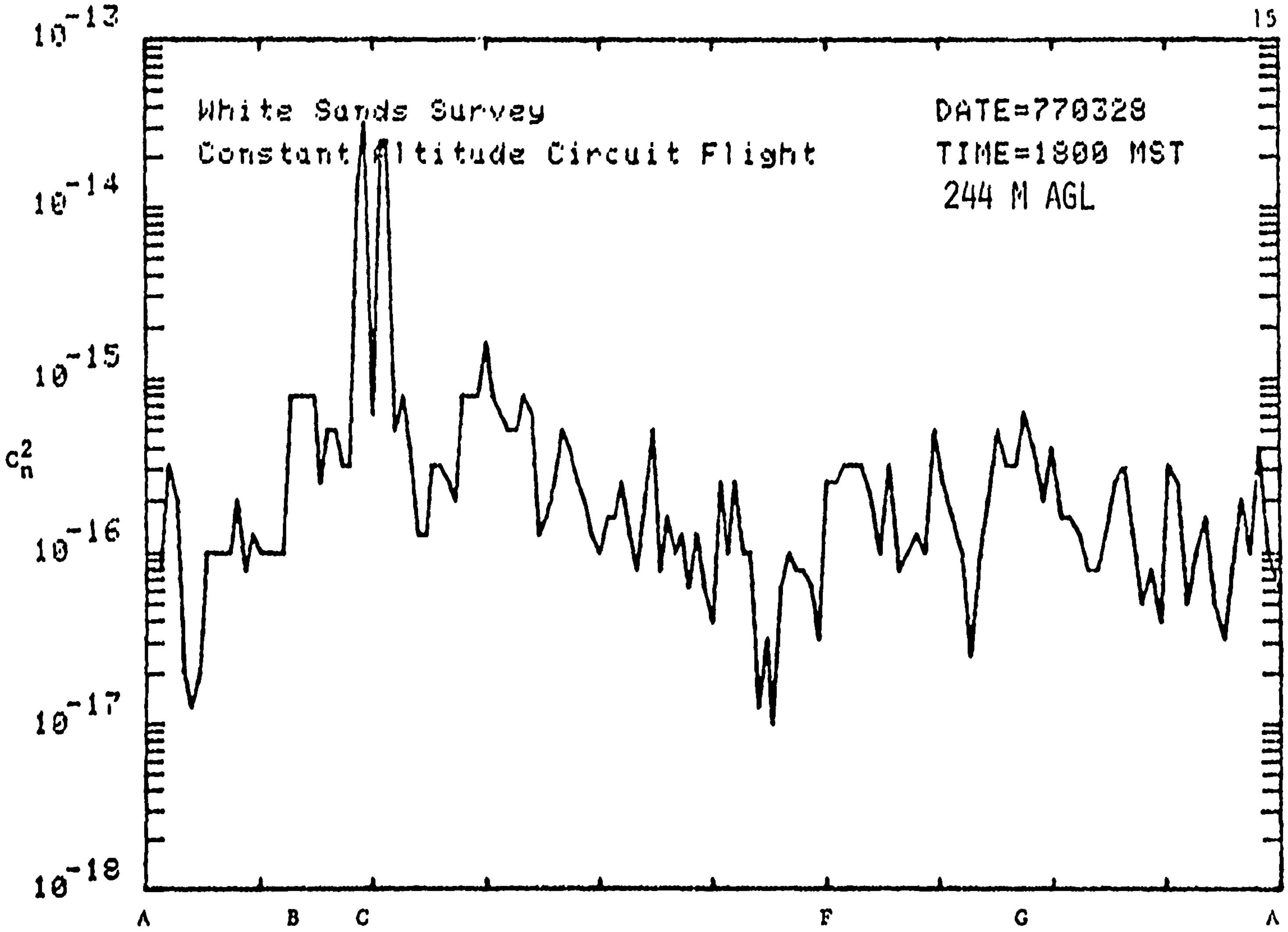
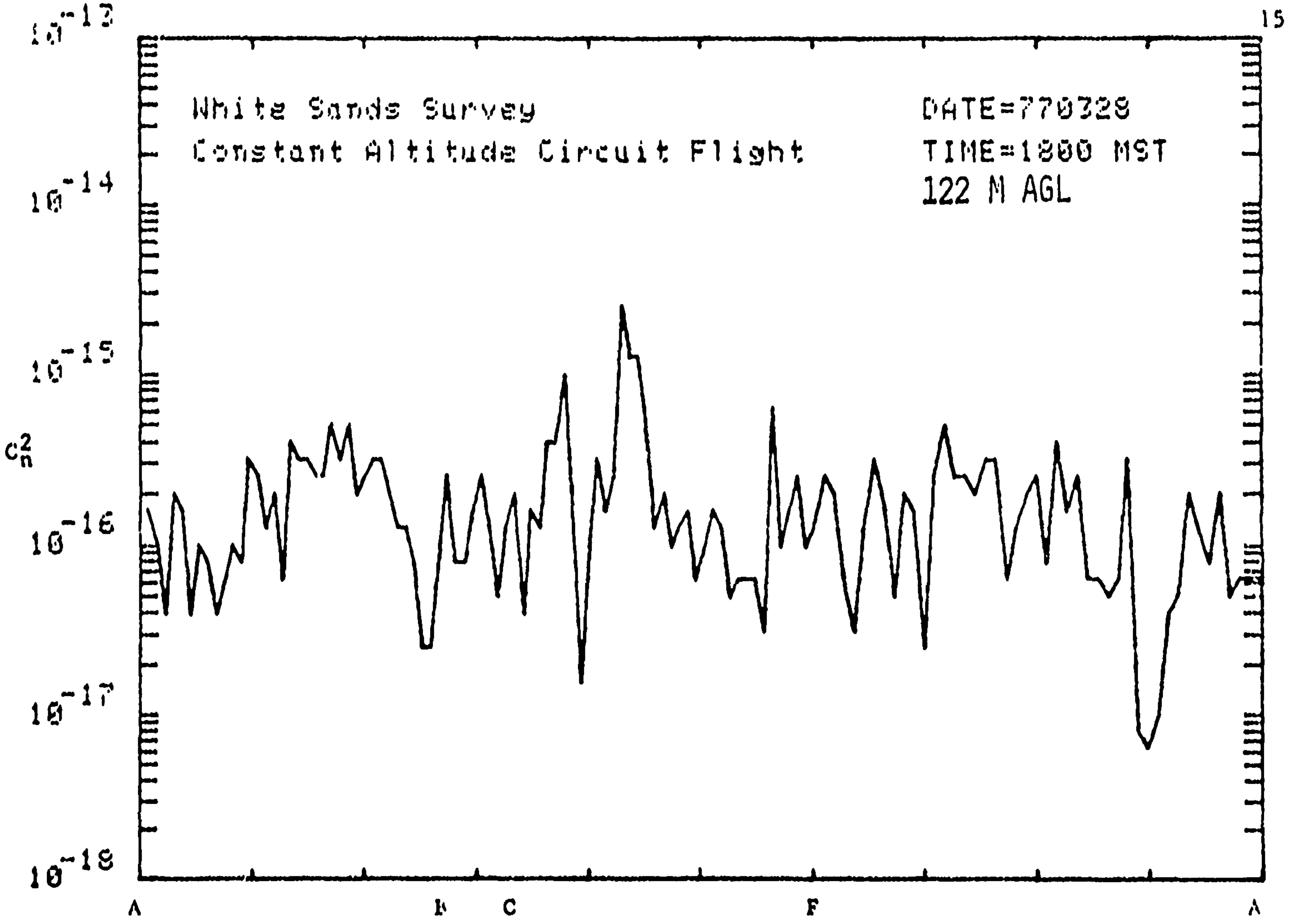
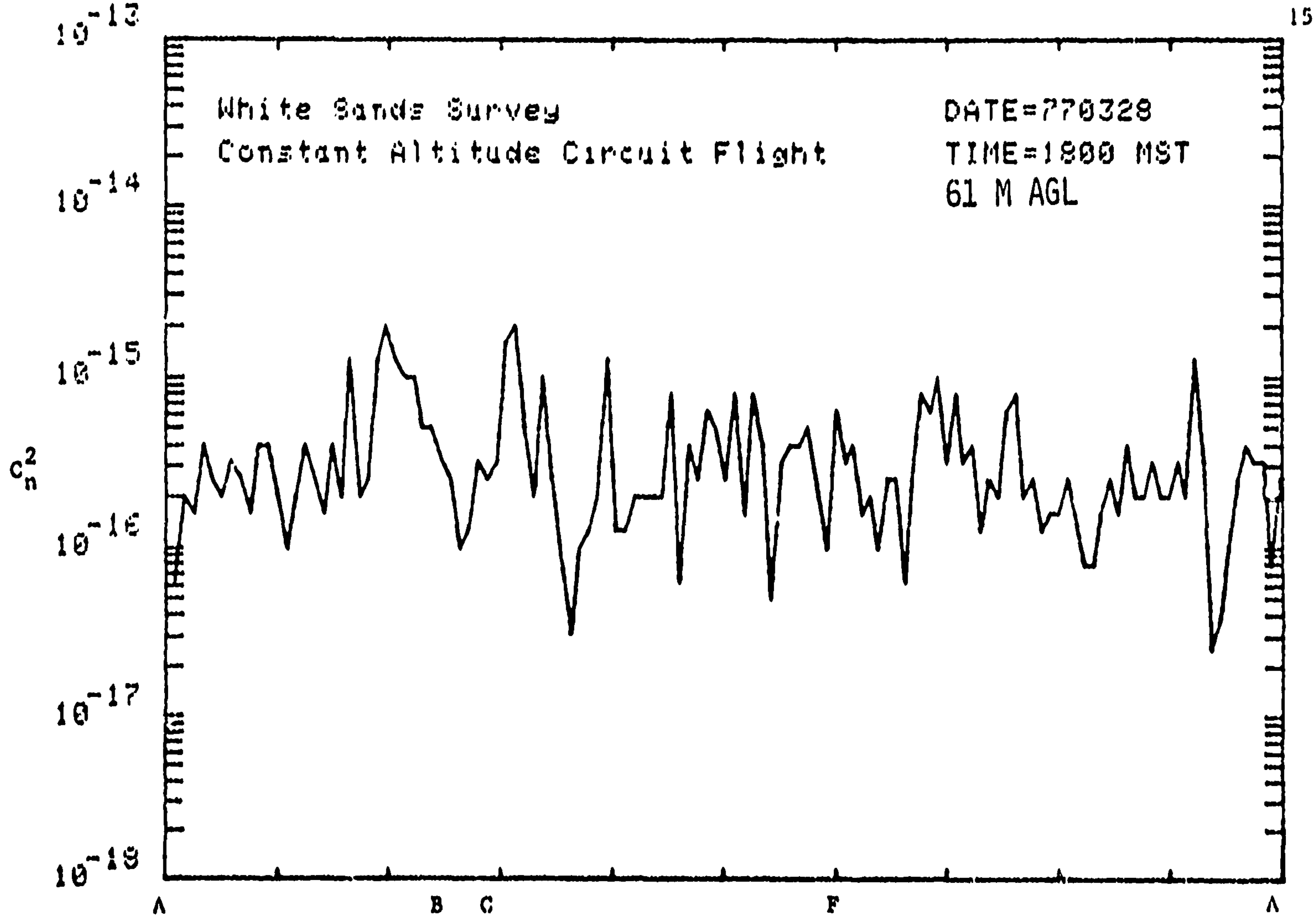
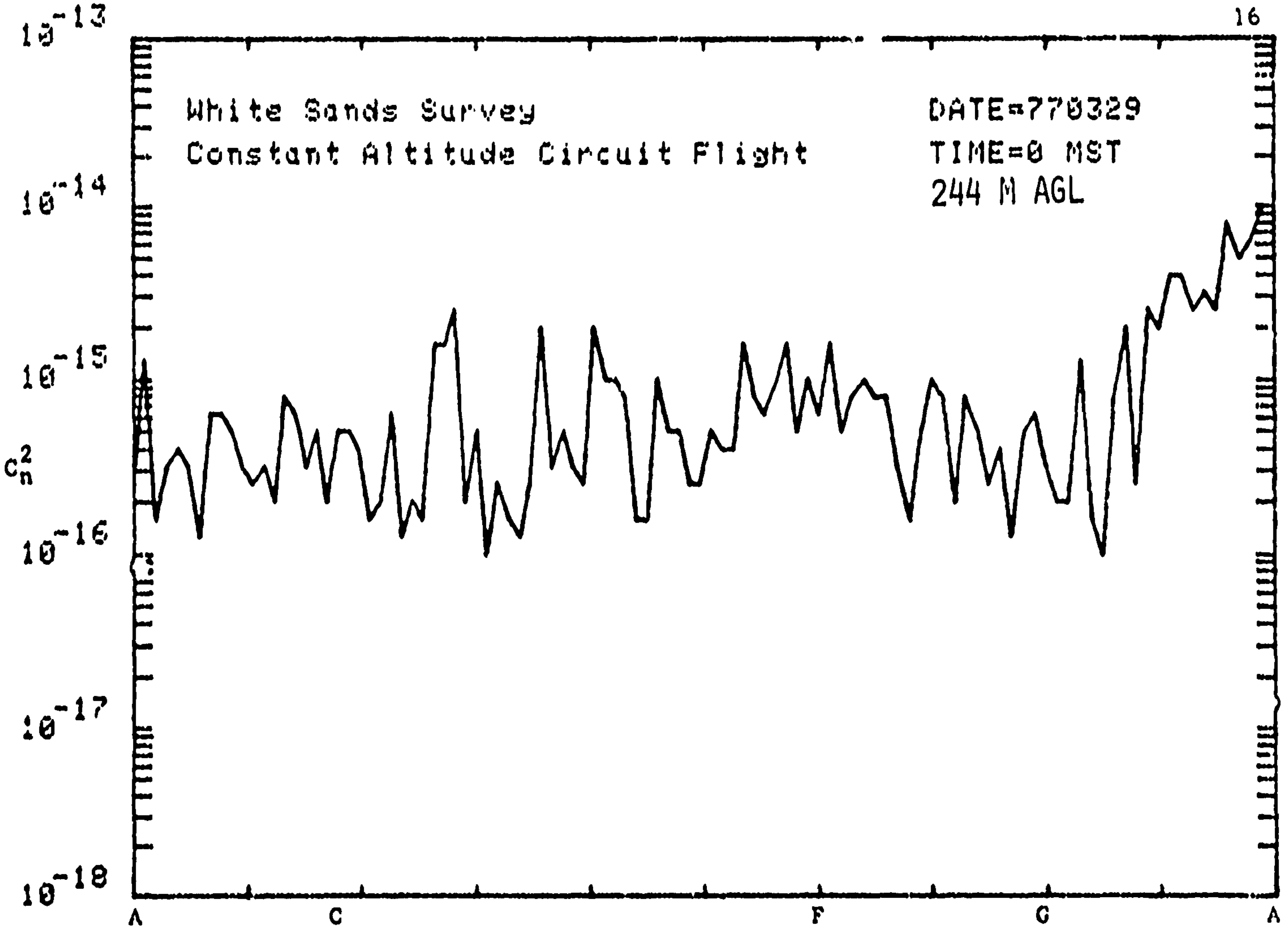
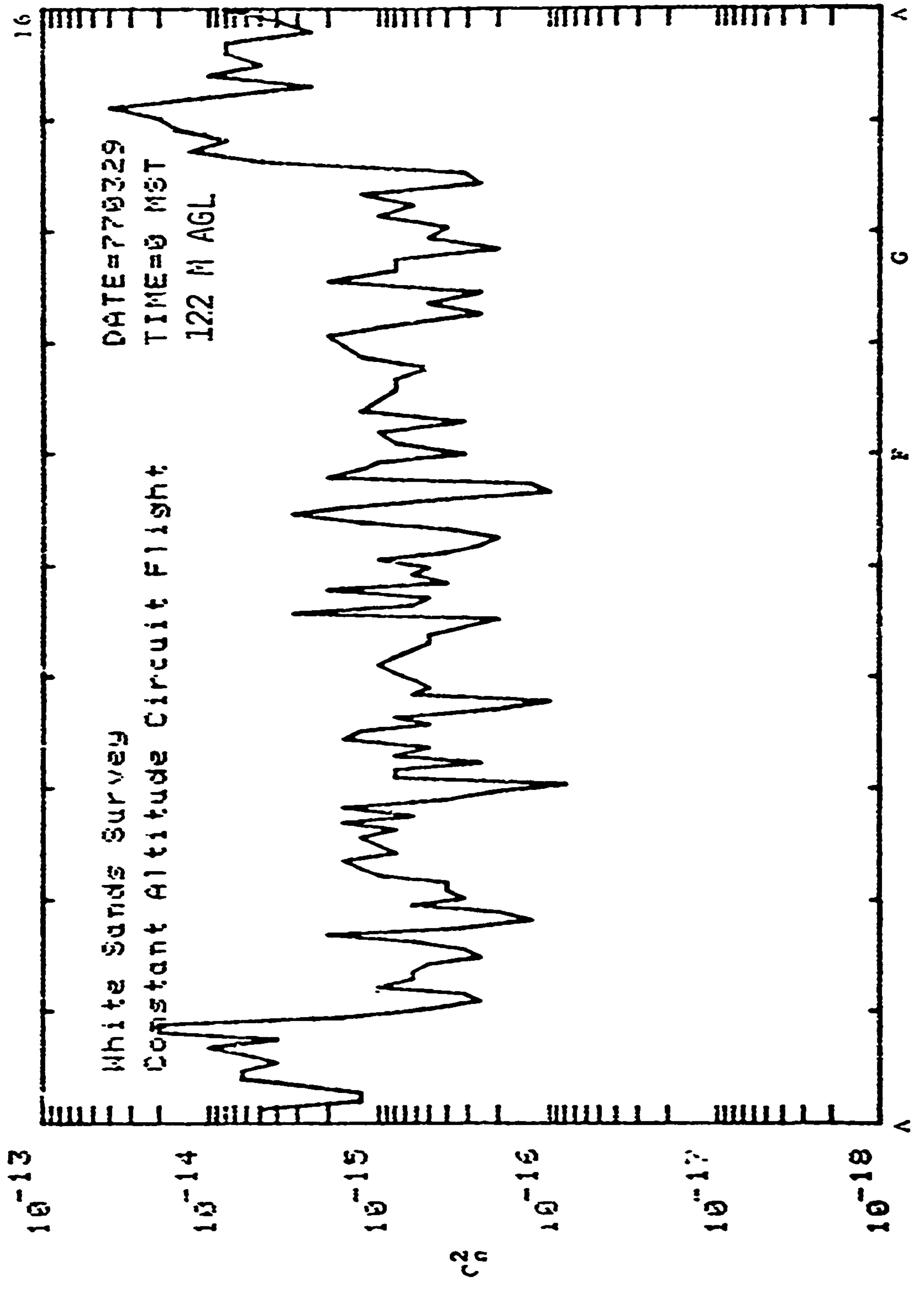
10^{-18}
A
B
C
D
E
F
G
A

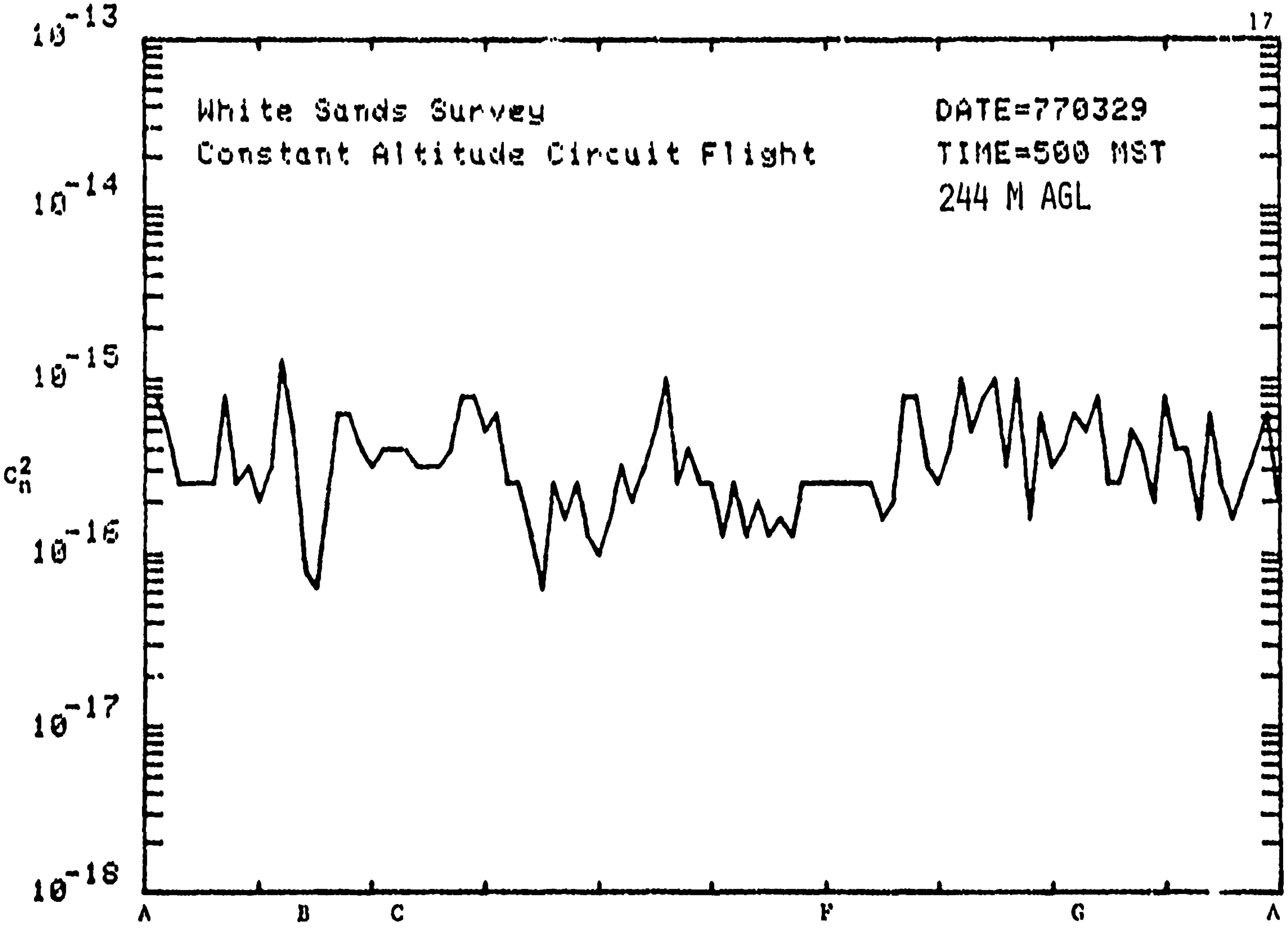

White Sands Survey
Constant Altitude Circuit Flight
DATE=770328
TIME=1800 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
15
A
B
C
F
G
A

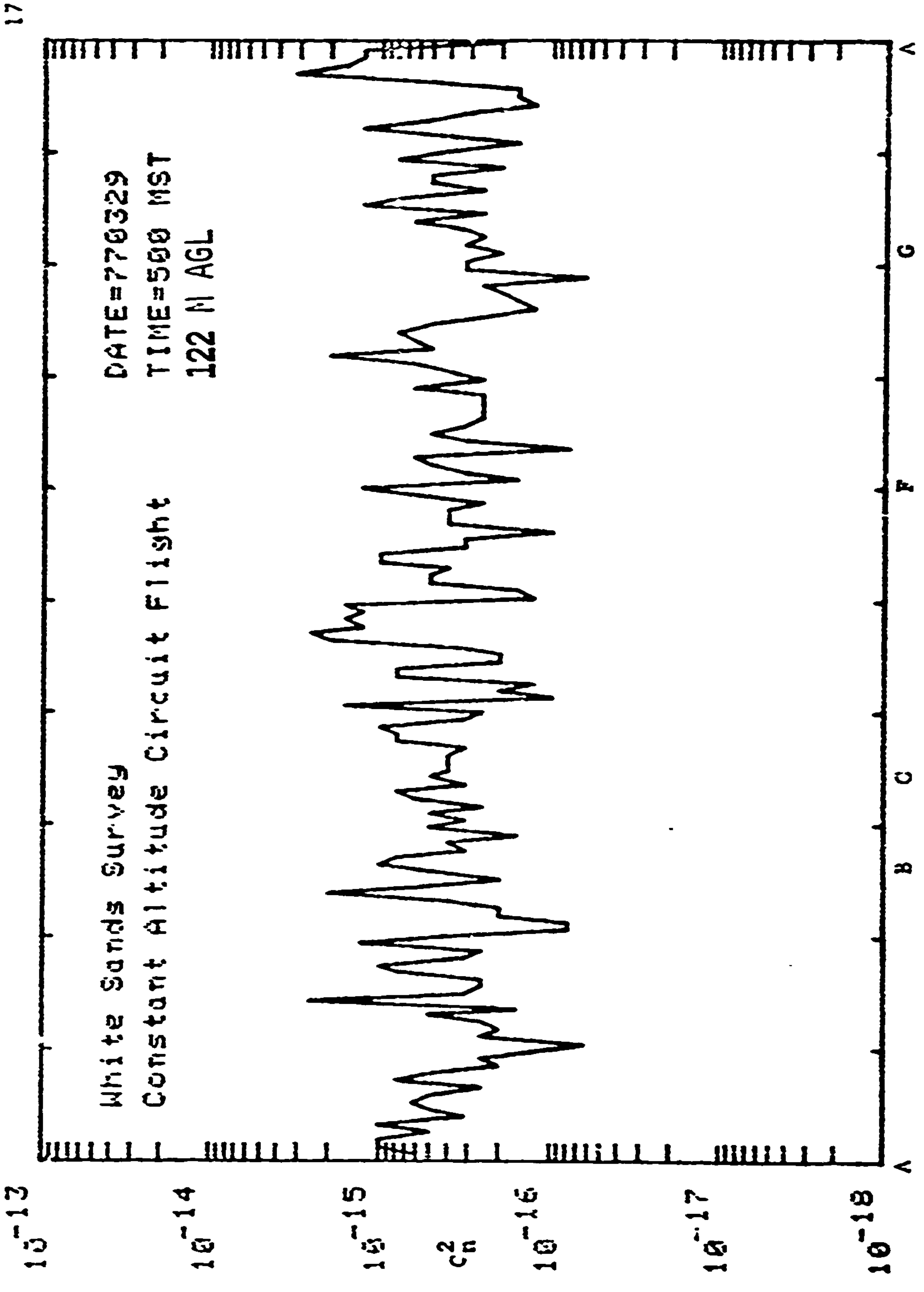

White Sands Survey
Constant Altitude Circuit Flight
DATE=770328
TIME=1800 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
15
A
B
C
F
A

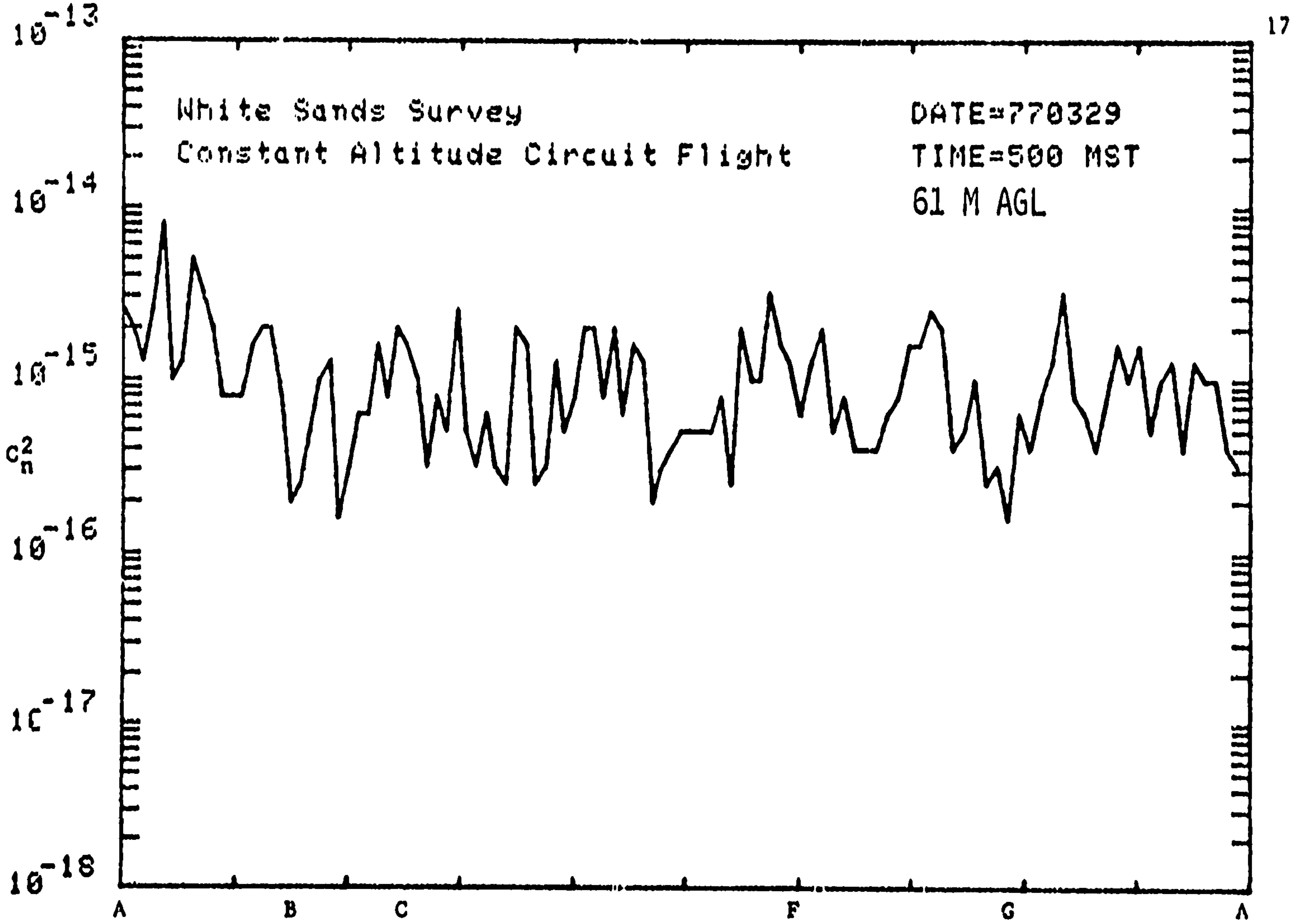

White Sands Survey
Constant Altitude Circuit Flight
DATE=770328
TIME=1800 MST
61 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
15
A
B
C
F
A

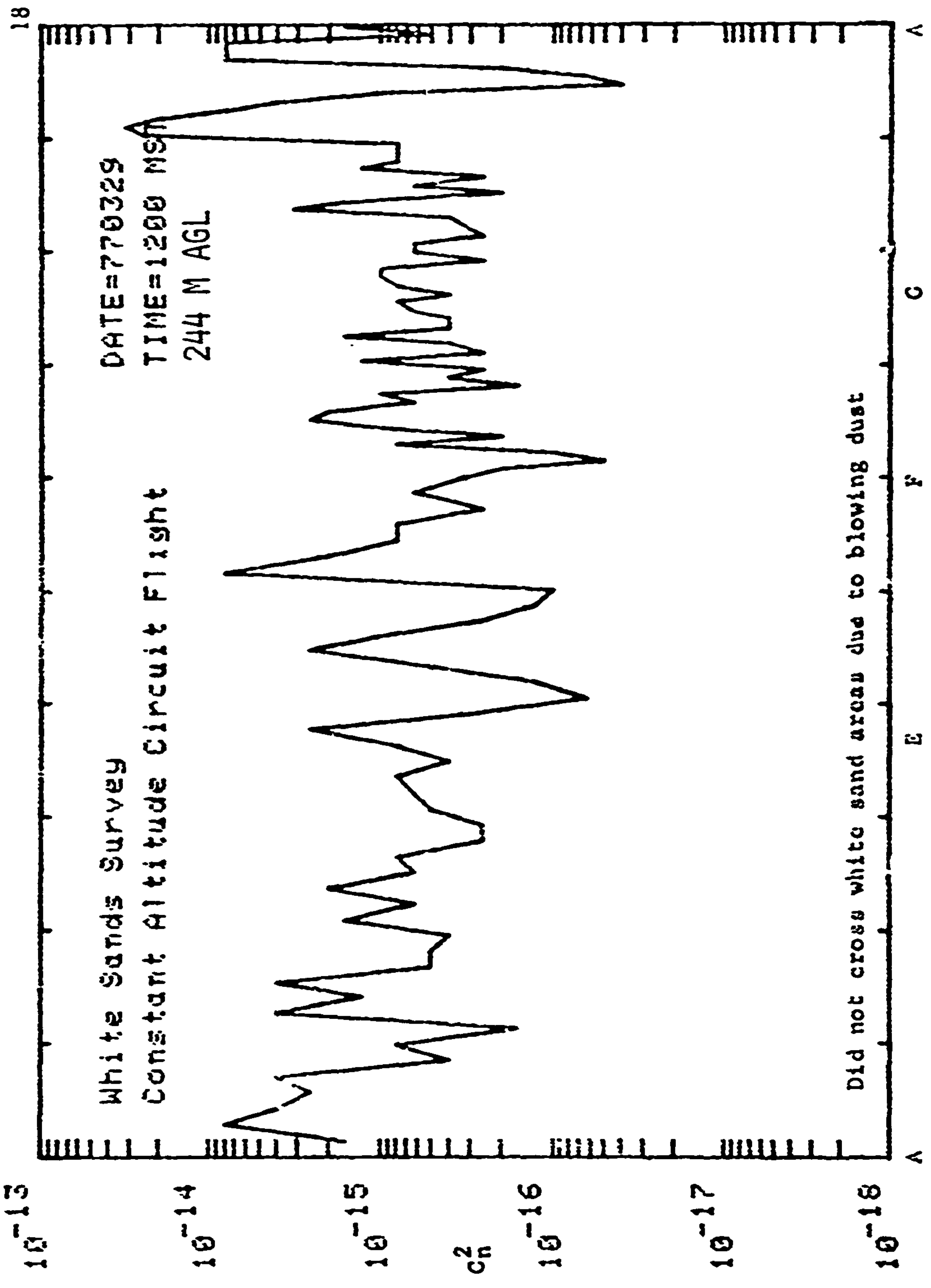

White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=0 MST
244 M AGL
16
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
C
F
G
A

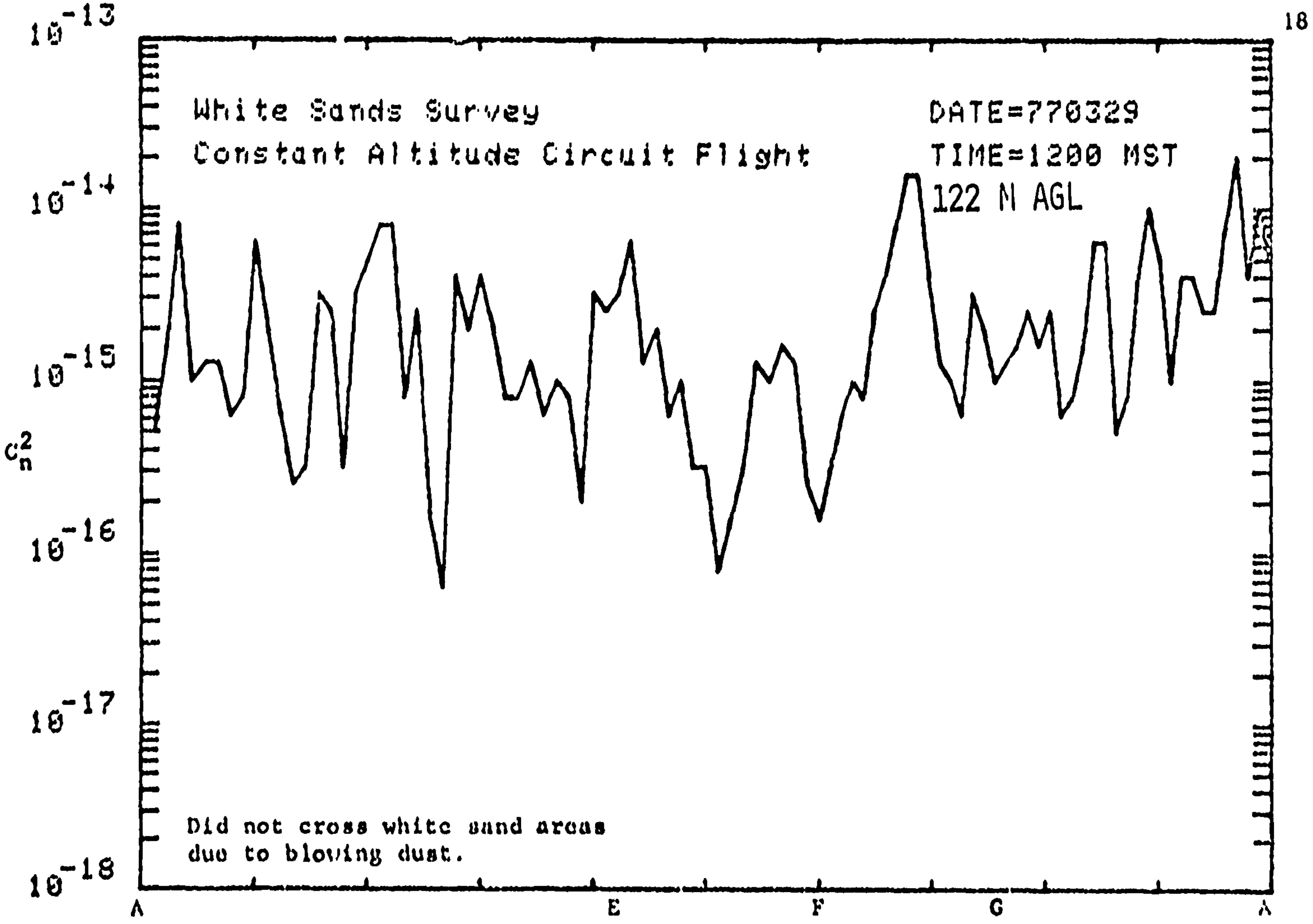

White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=0 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
16
A
G
F
A

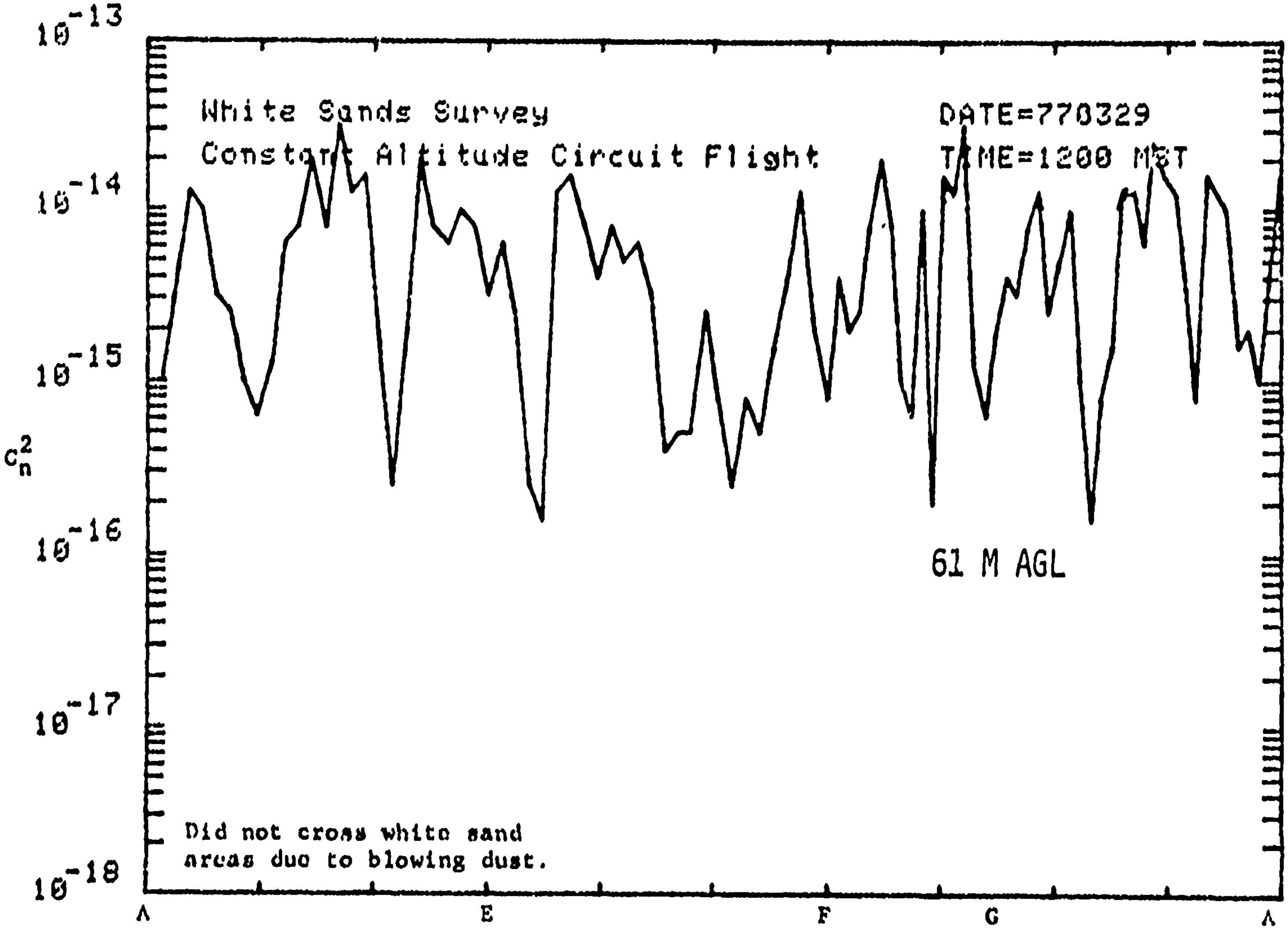

White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=500 MST
244 M AGL
17
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
A
B
C
F
G
A


17
White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=500 MST
122 M AGL
10^-13
10^-14
10^-15
C_n^2
10^-16
10^-17
10^-18
A
B
C
F
G
A

17
White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=500 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
A
B
C
F
G
A

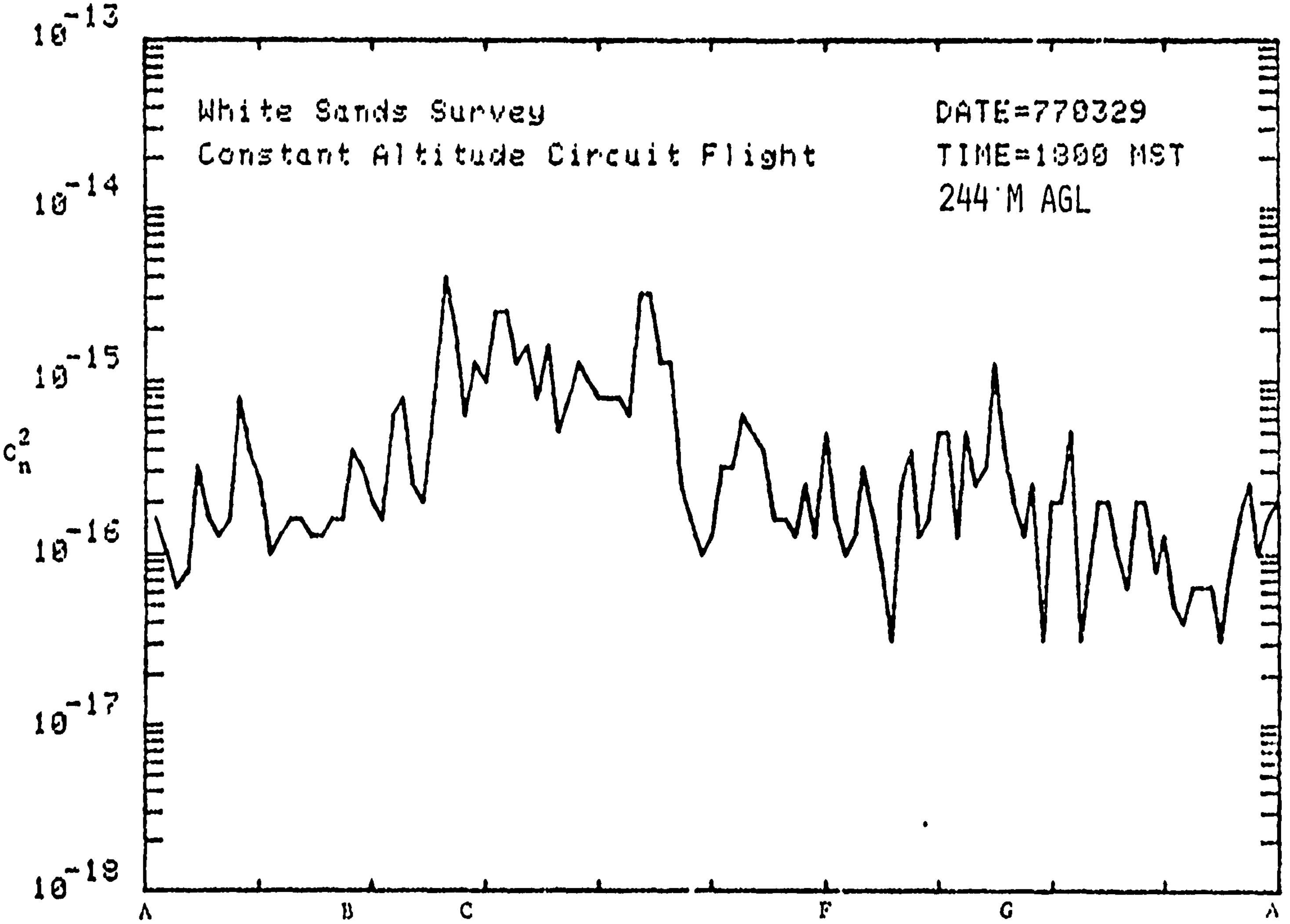

White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1200 MST
244 M AGL
Did not cross white sand areas due to blowing dust
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
A
E
F
C
A
18

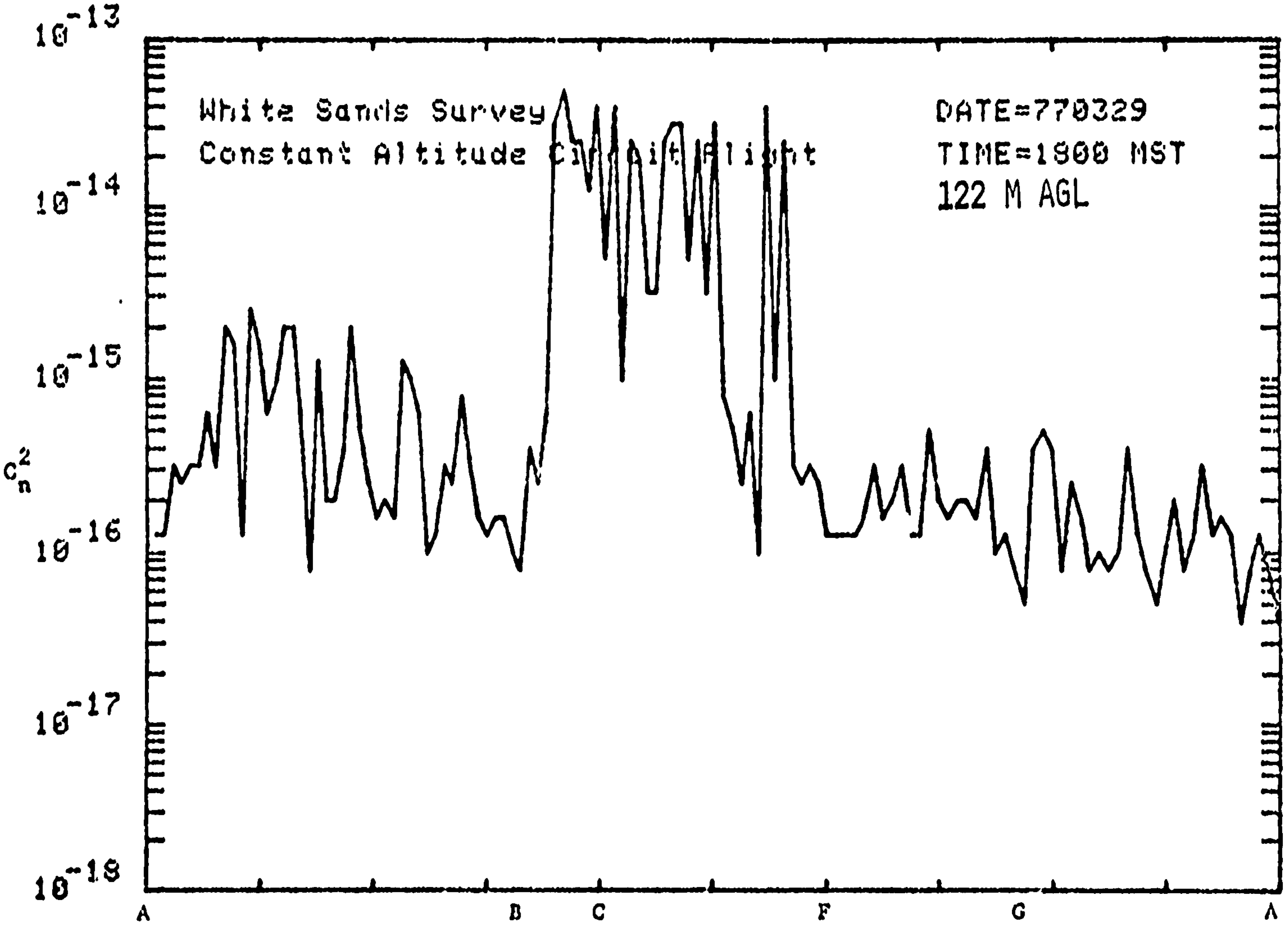

18
White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1200 MST
122 M AGL
Did not cross white sand areas due to blowing dust.
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1200 MST
61 M AGL
Did not cross white sand
areas due to blowing dust.
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
A
E
F
G
A

18

19


White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1300 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1800 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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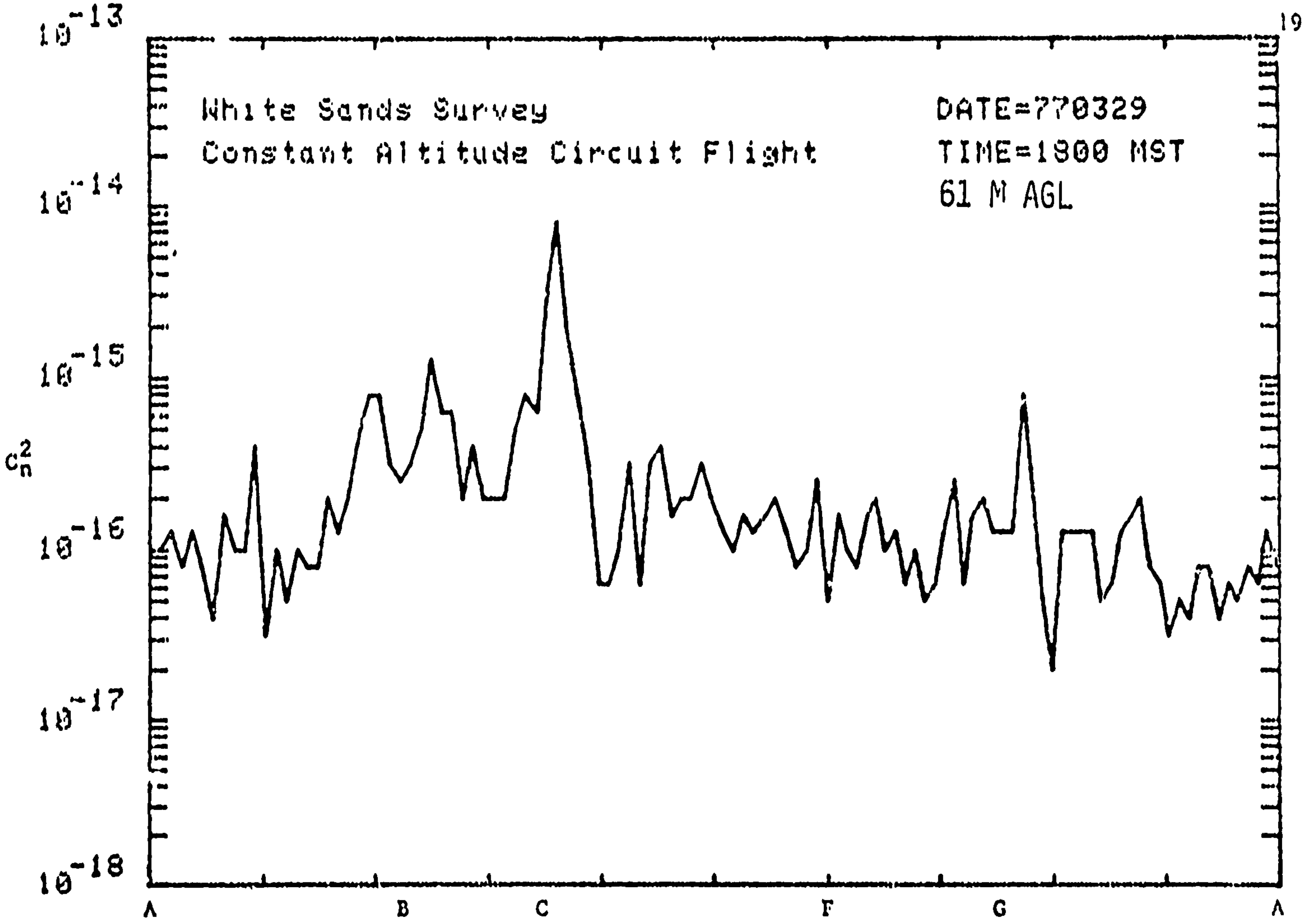
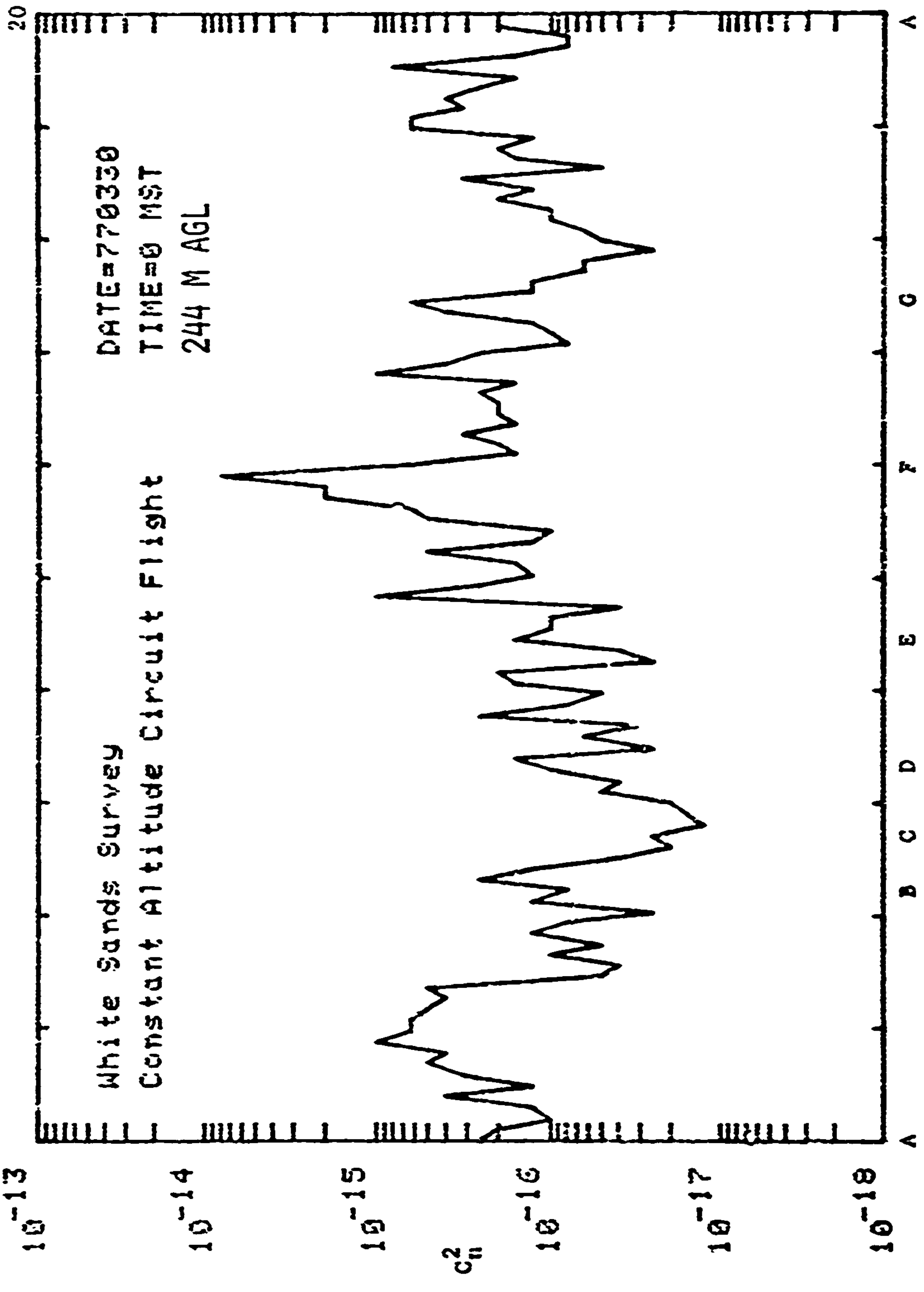
10^{-18}
A
B
C
F
G
A

19


19
White Sands Survey
Constant Altitude Circuit Flight
DATE=770329
TIME=1800 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=0 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
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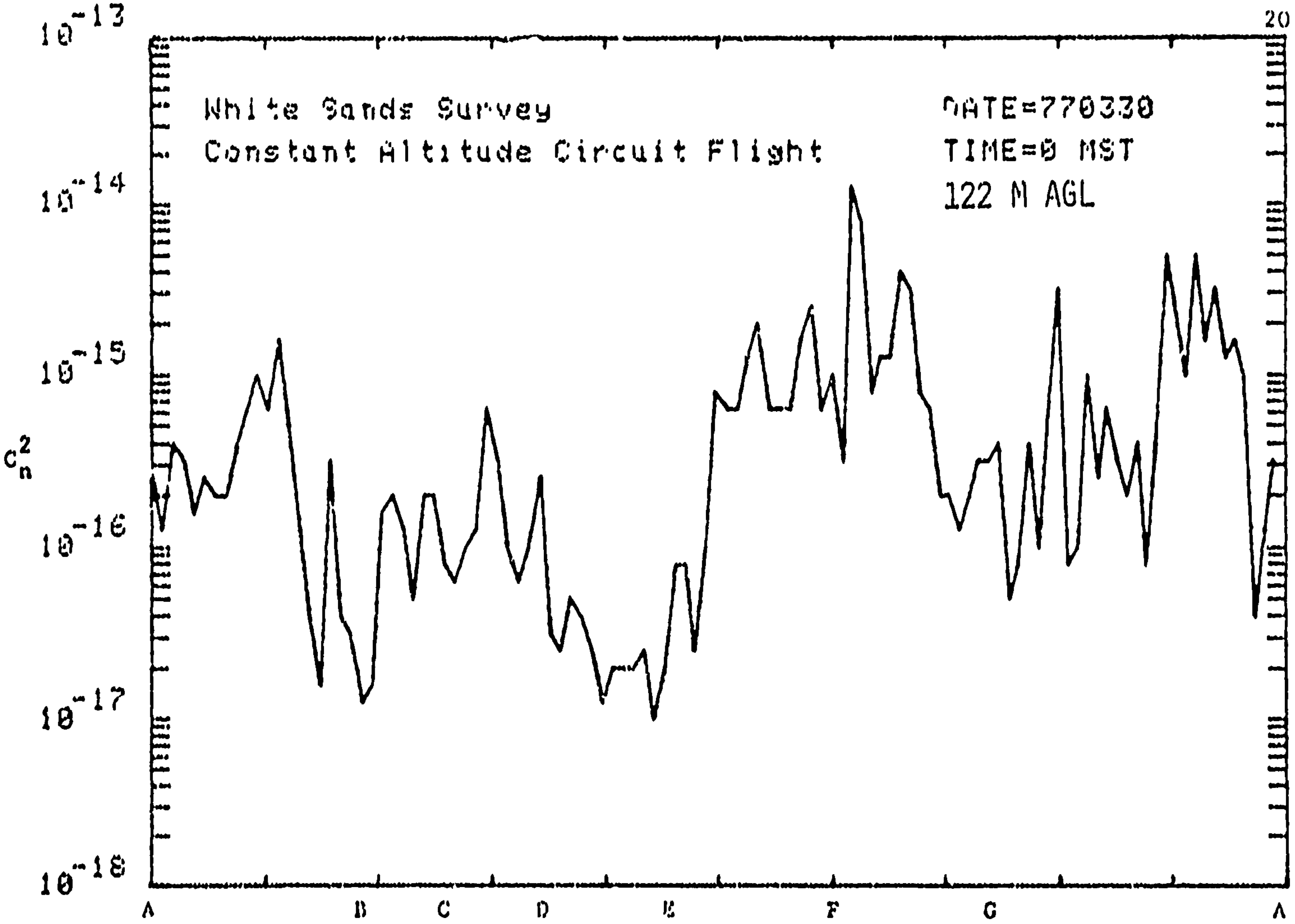
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=0 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
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C_n^2
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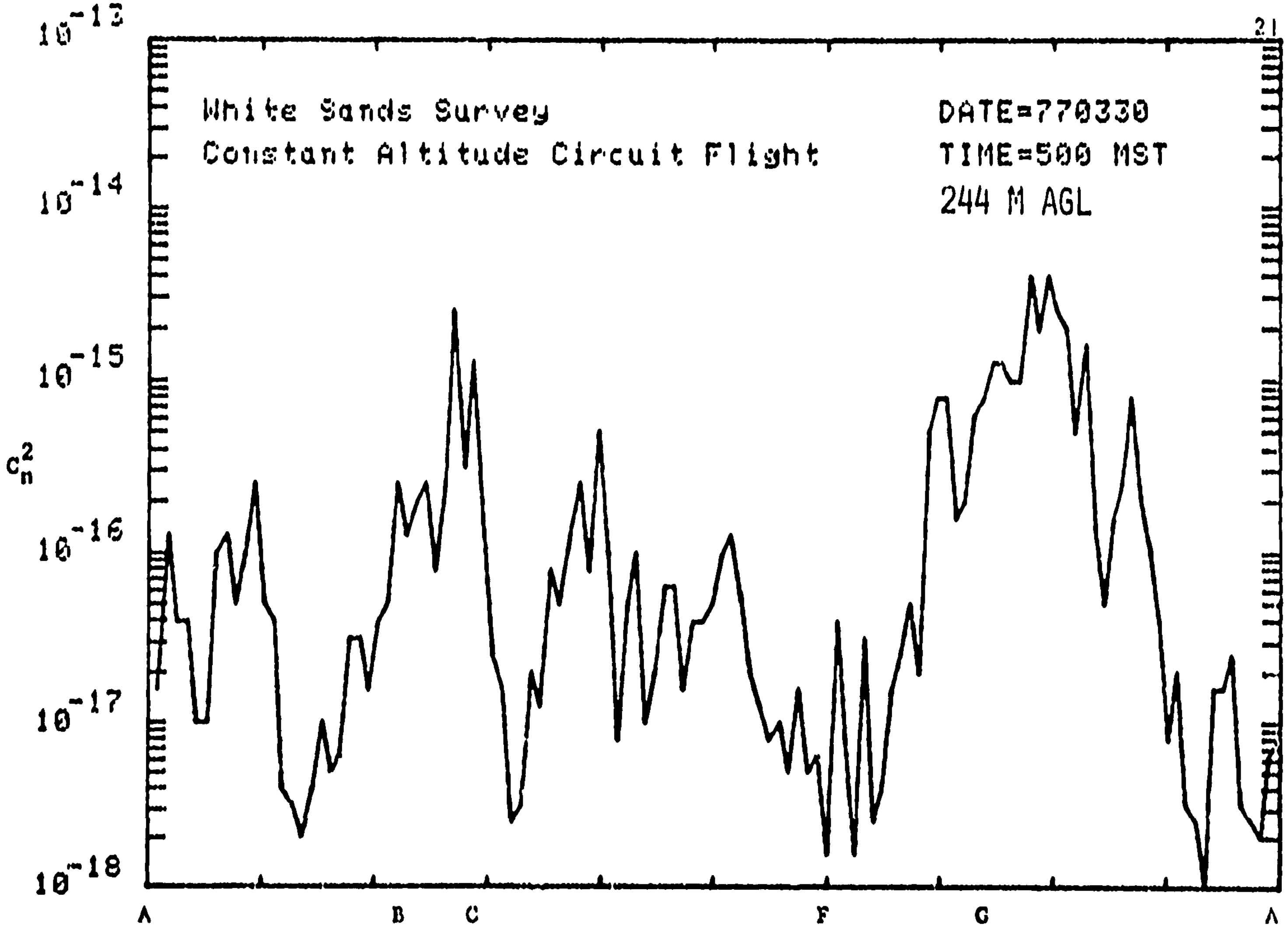
D
E
F
G
A
20


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=500 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-18}
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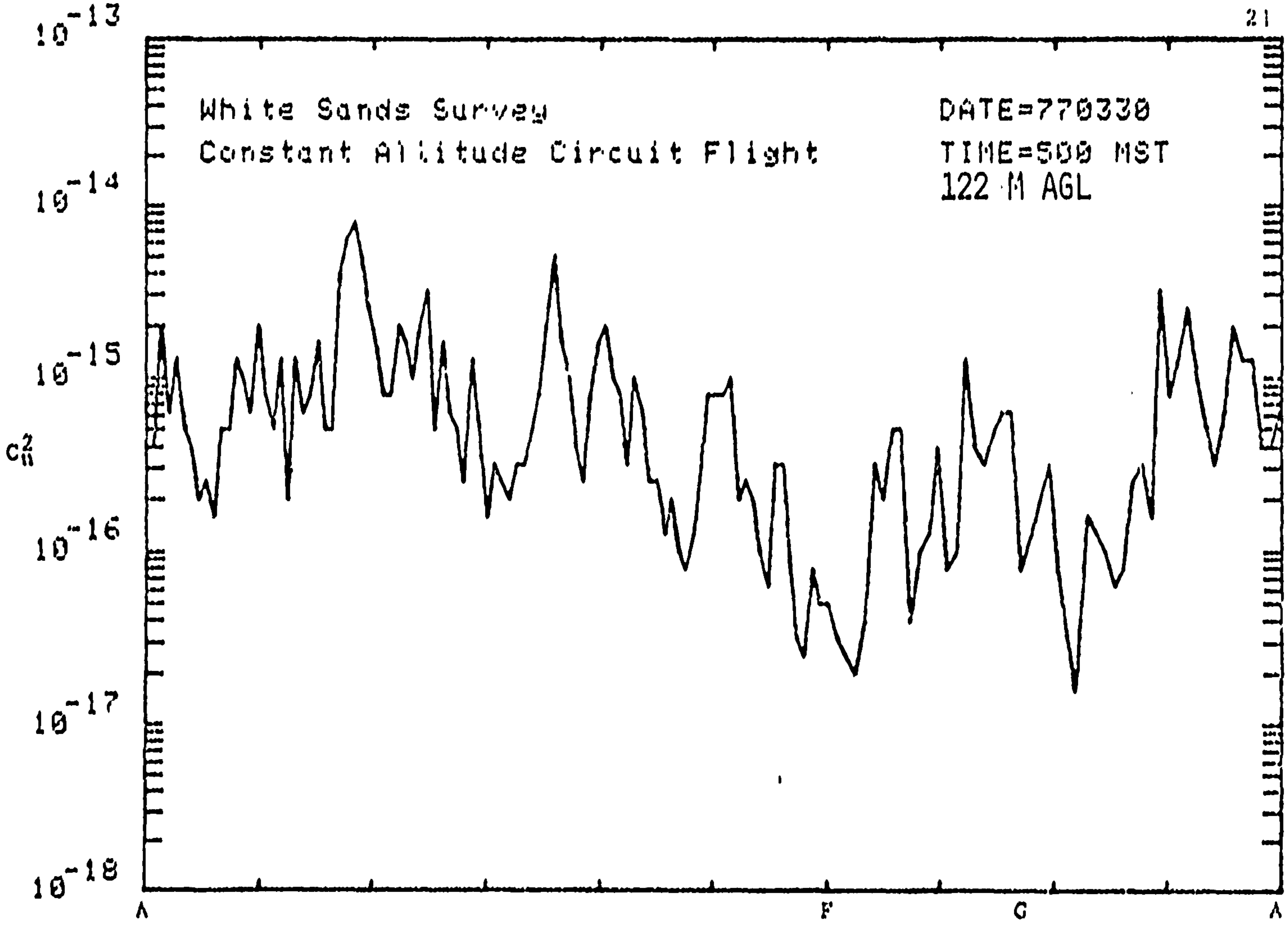
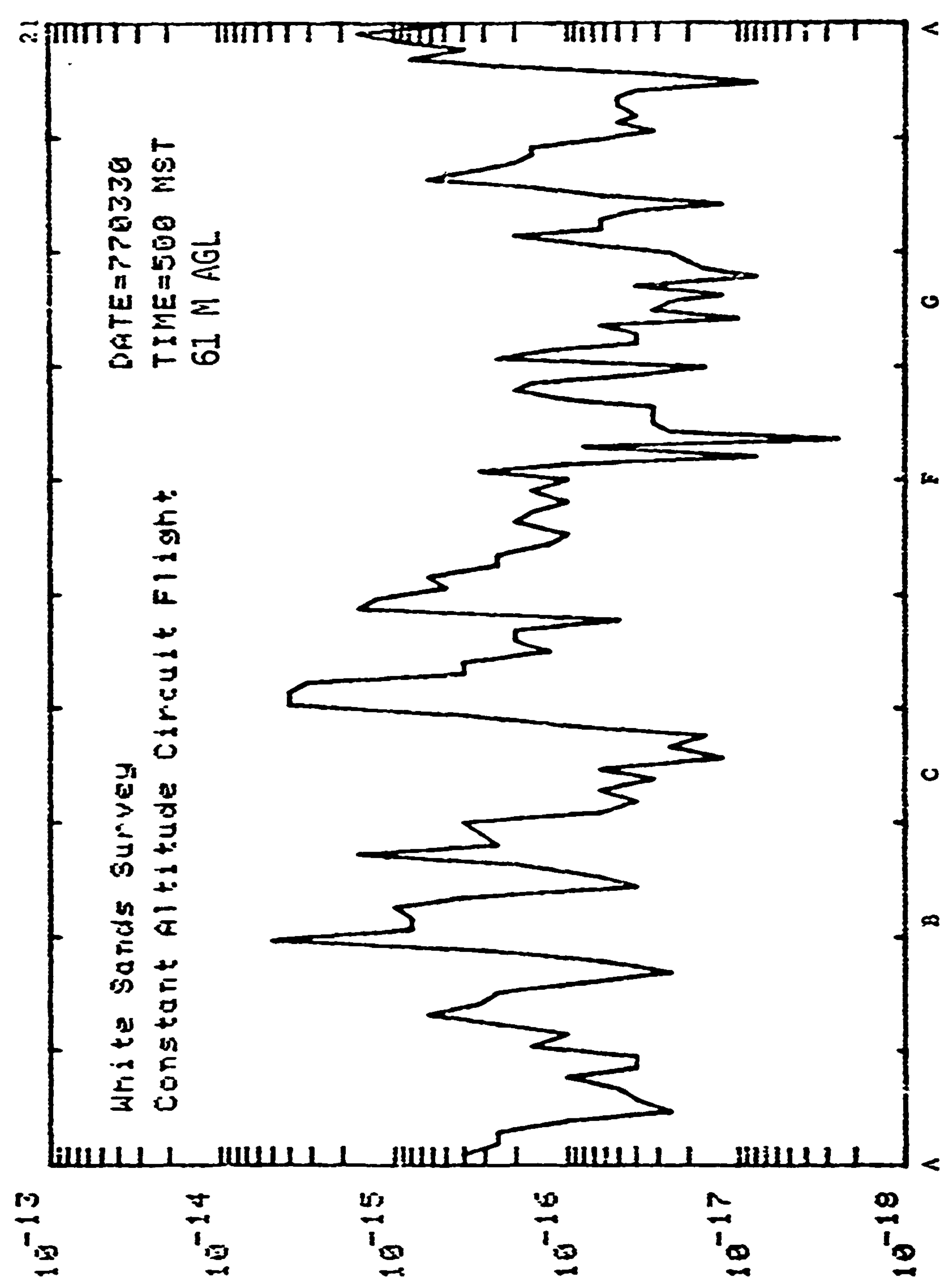
A
B
C
F
G
A


21
White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=500 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=500 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
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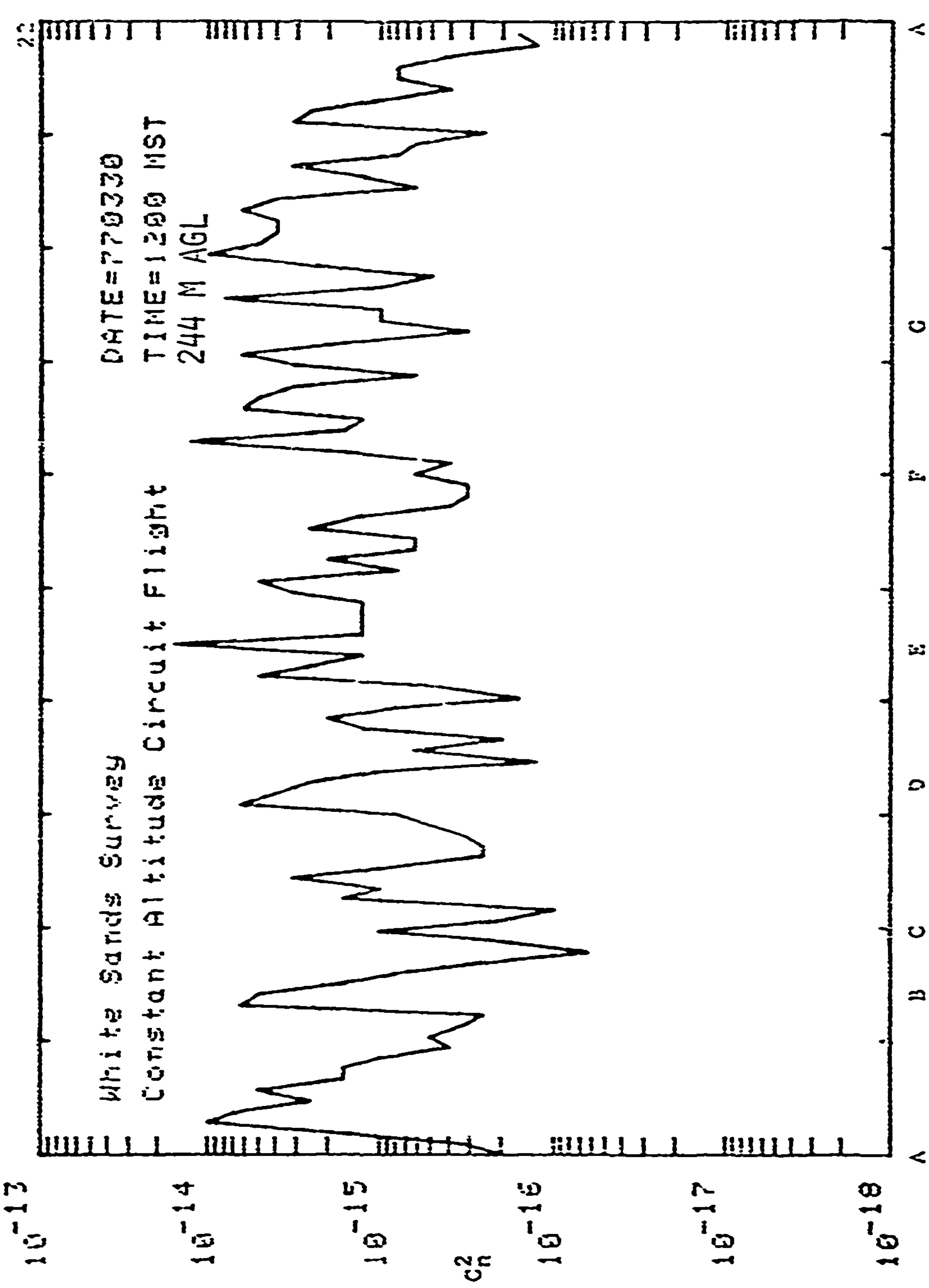
10^{-18}
C_n^2
A
B
C
F
G
A
21



White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1200 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
C_n^2
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10^{-17}
10^{-18}
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B
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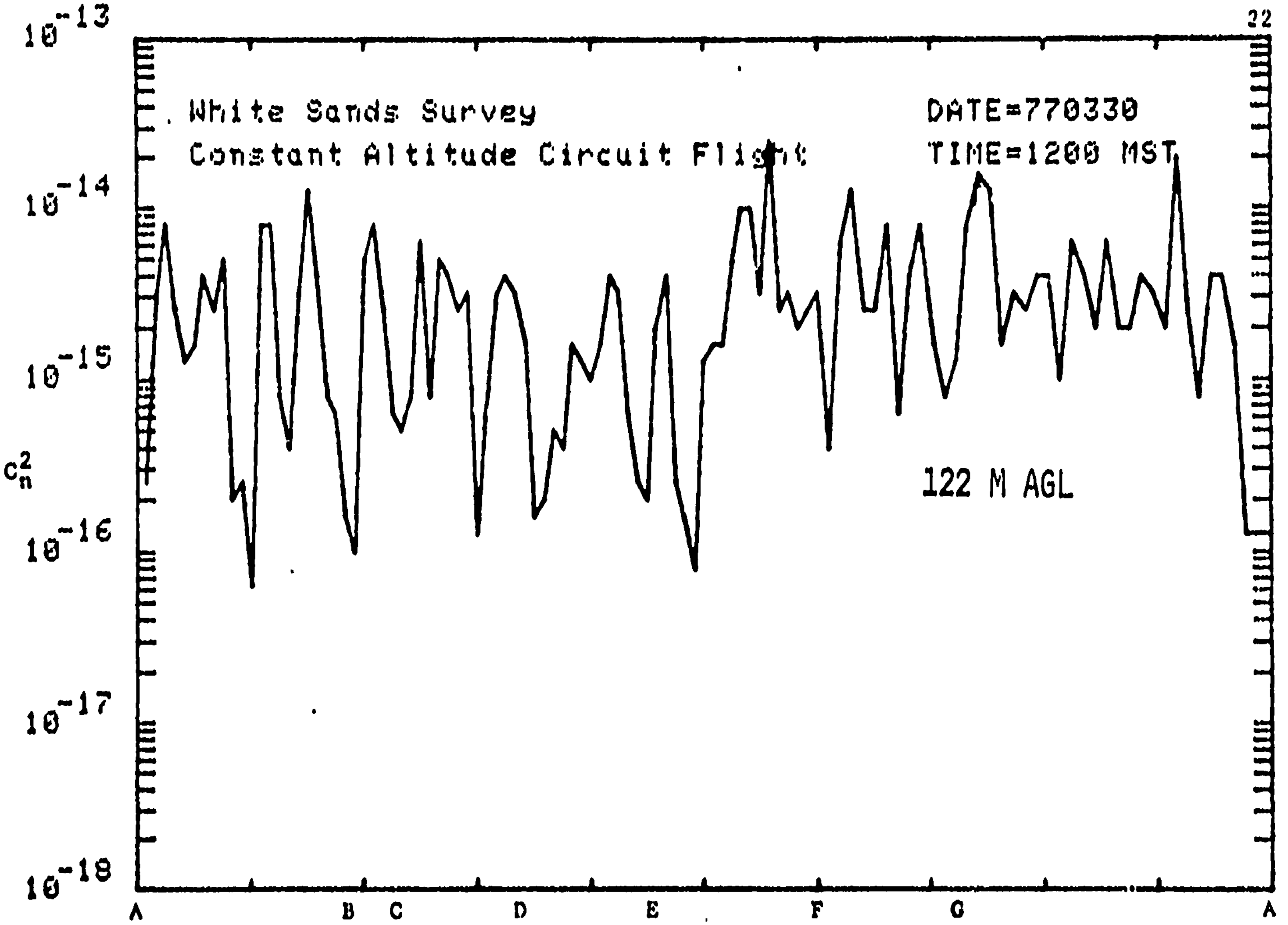
D
E
F
G
A
22


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1200 MST
122 M AGL
22
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
A
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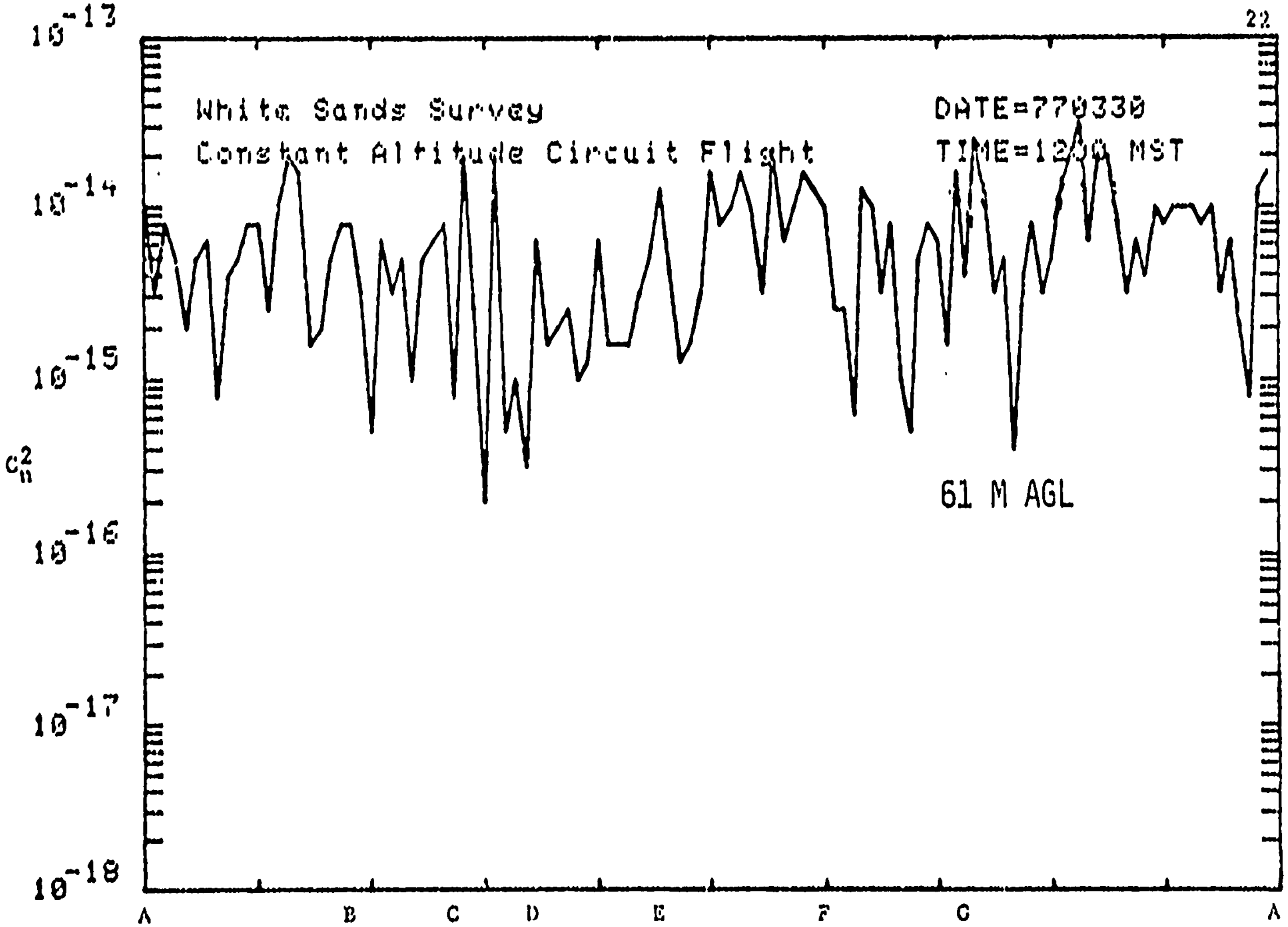
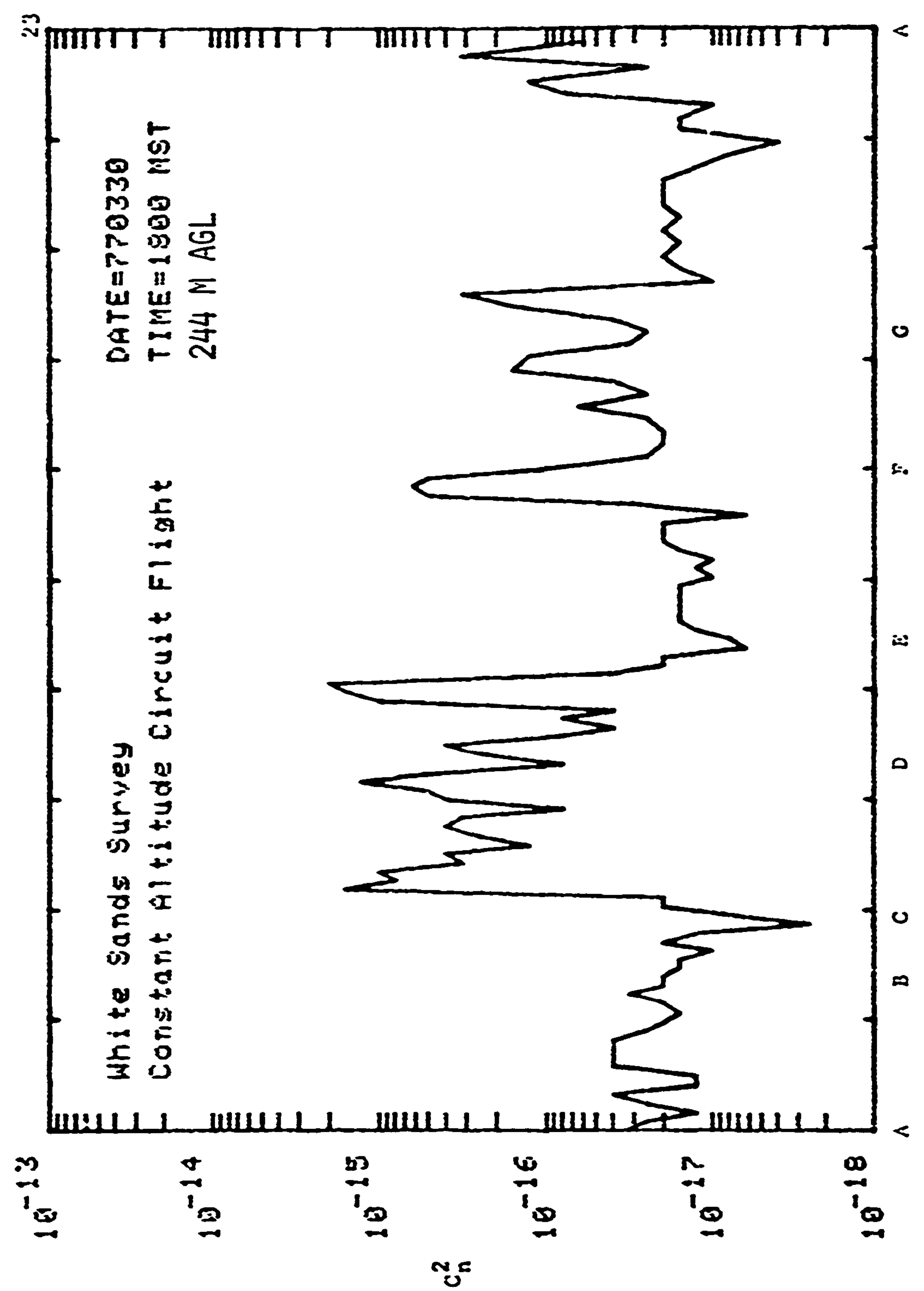
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1200 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
22
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1900 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-18}
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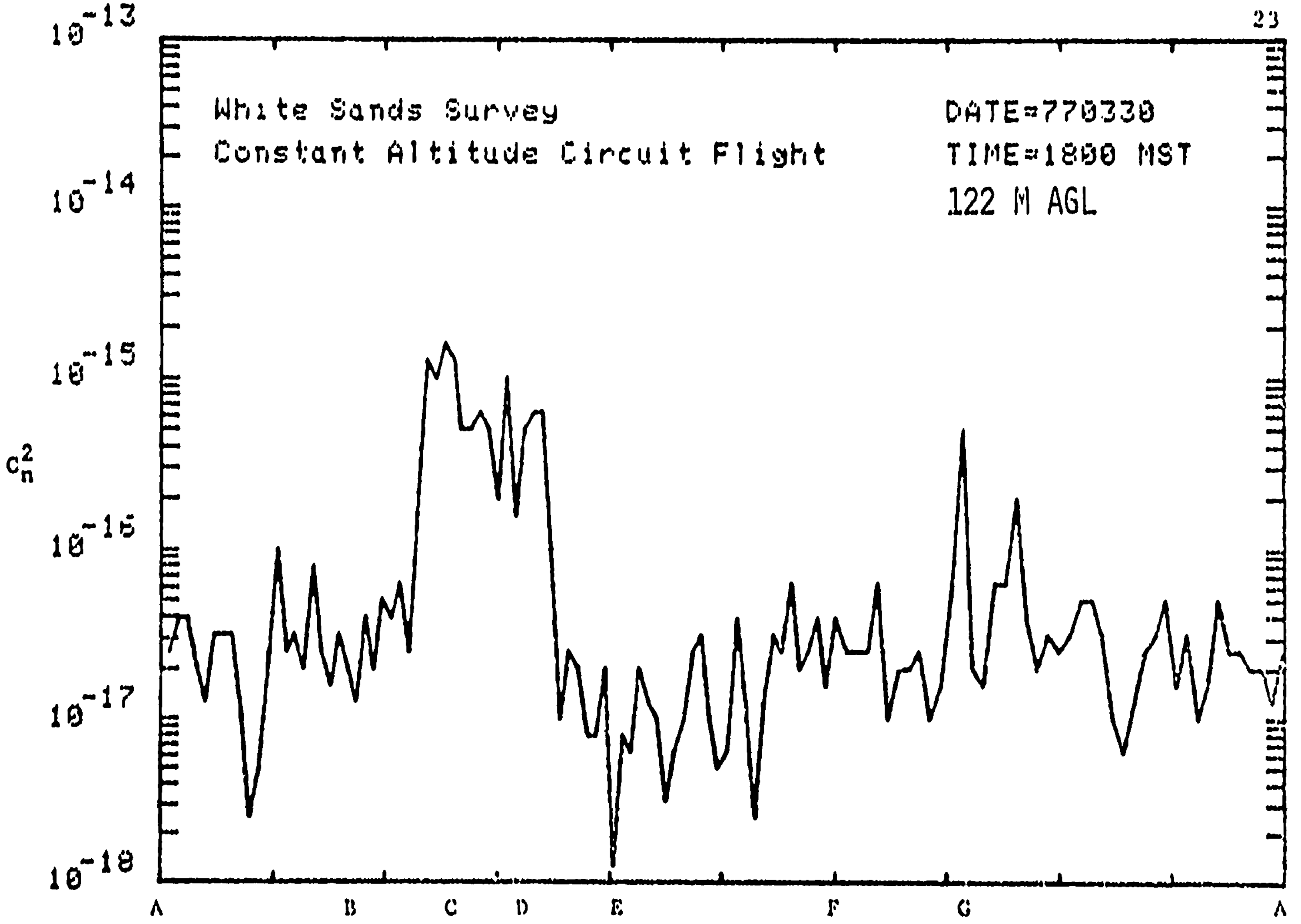
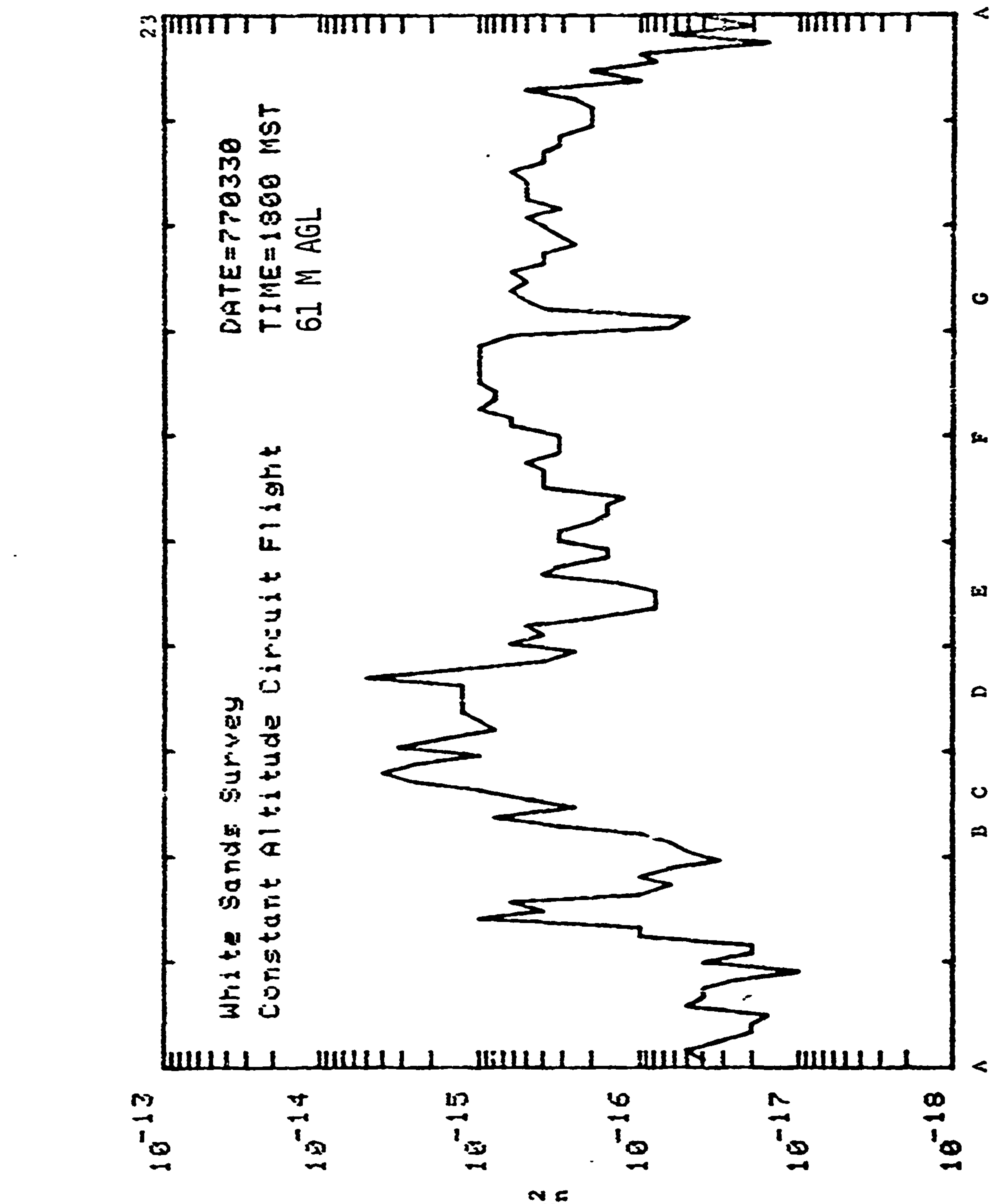
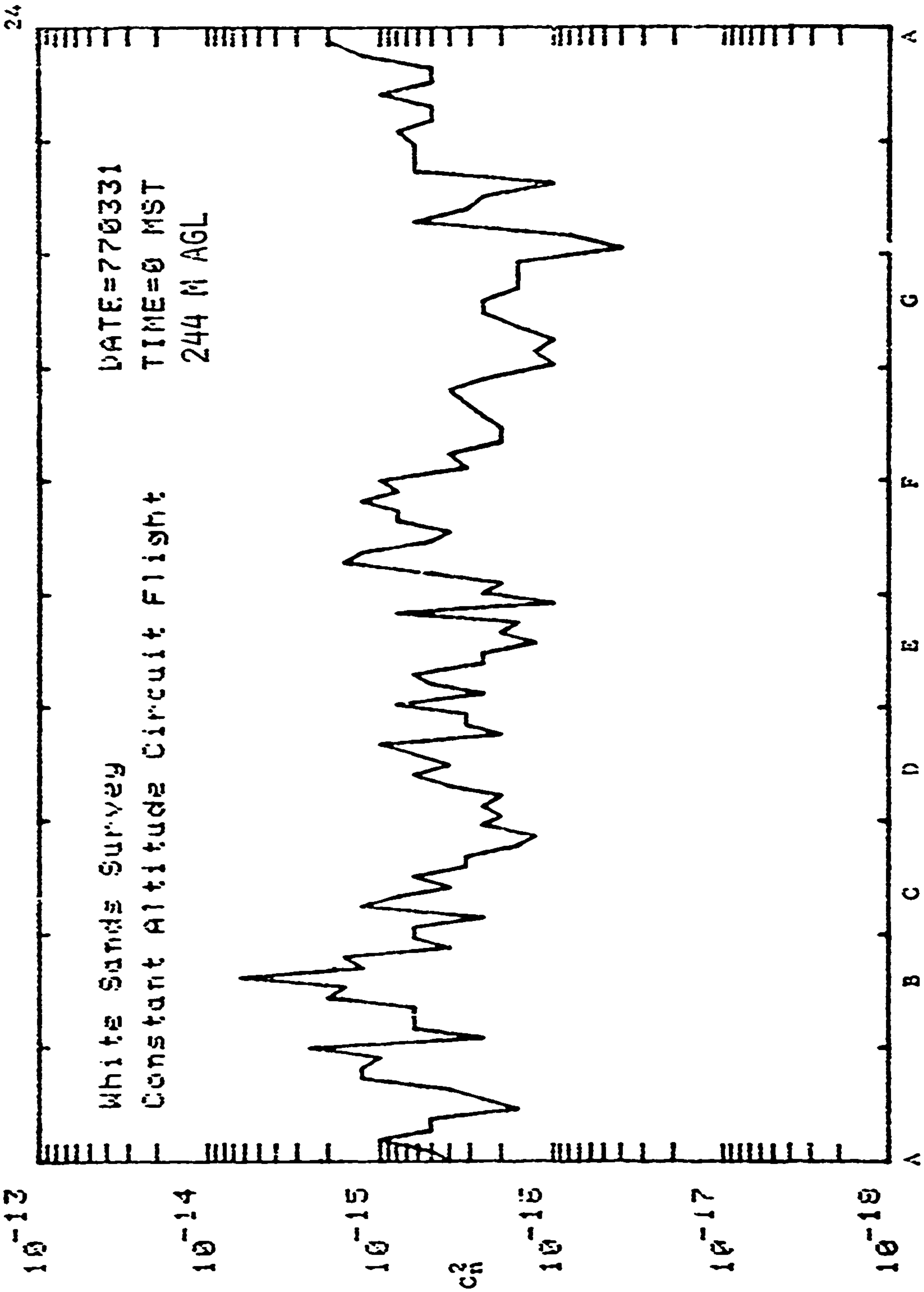
B
C
D
E
F
G
A
23


23
White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1800 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770330
TIME=1300 MST
61 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
B
C
D
E
F
G
A
23


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=0 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
C_n^2
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10^{-18}
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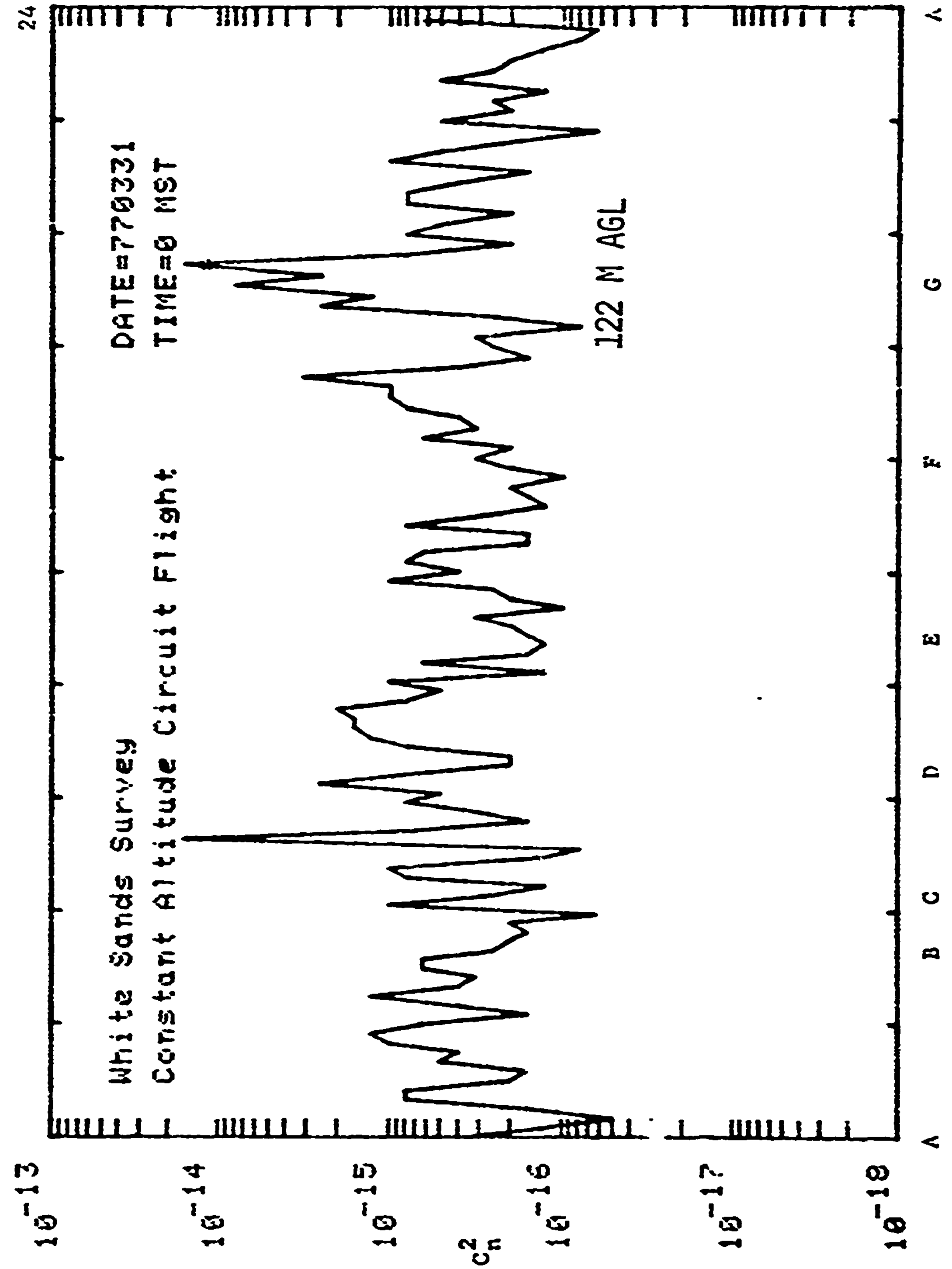
D
E
F
G
A
24


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=0 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
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C_n^2
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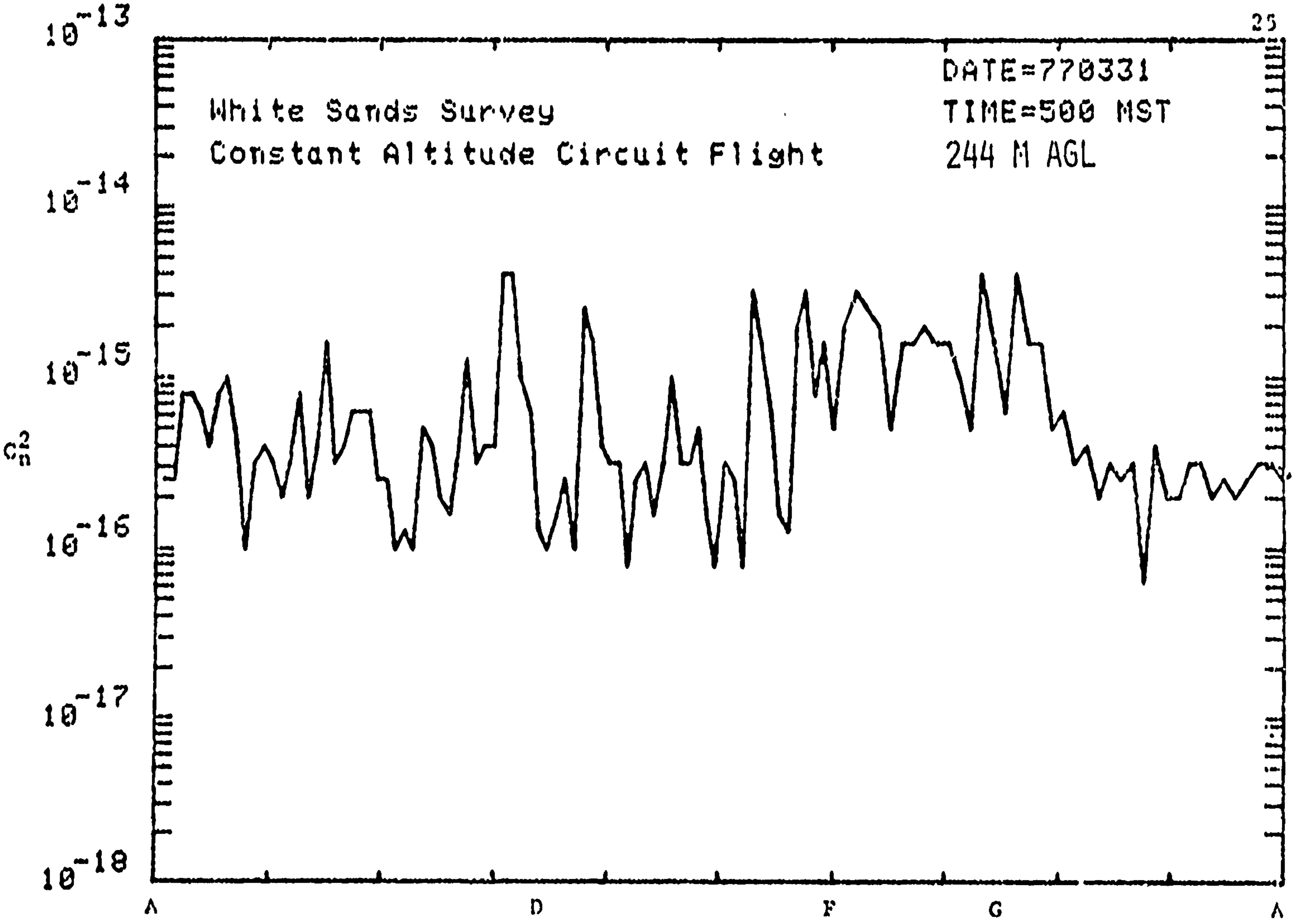
D
E
F
G
A
24


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=500 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
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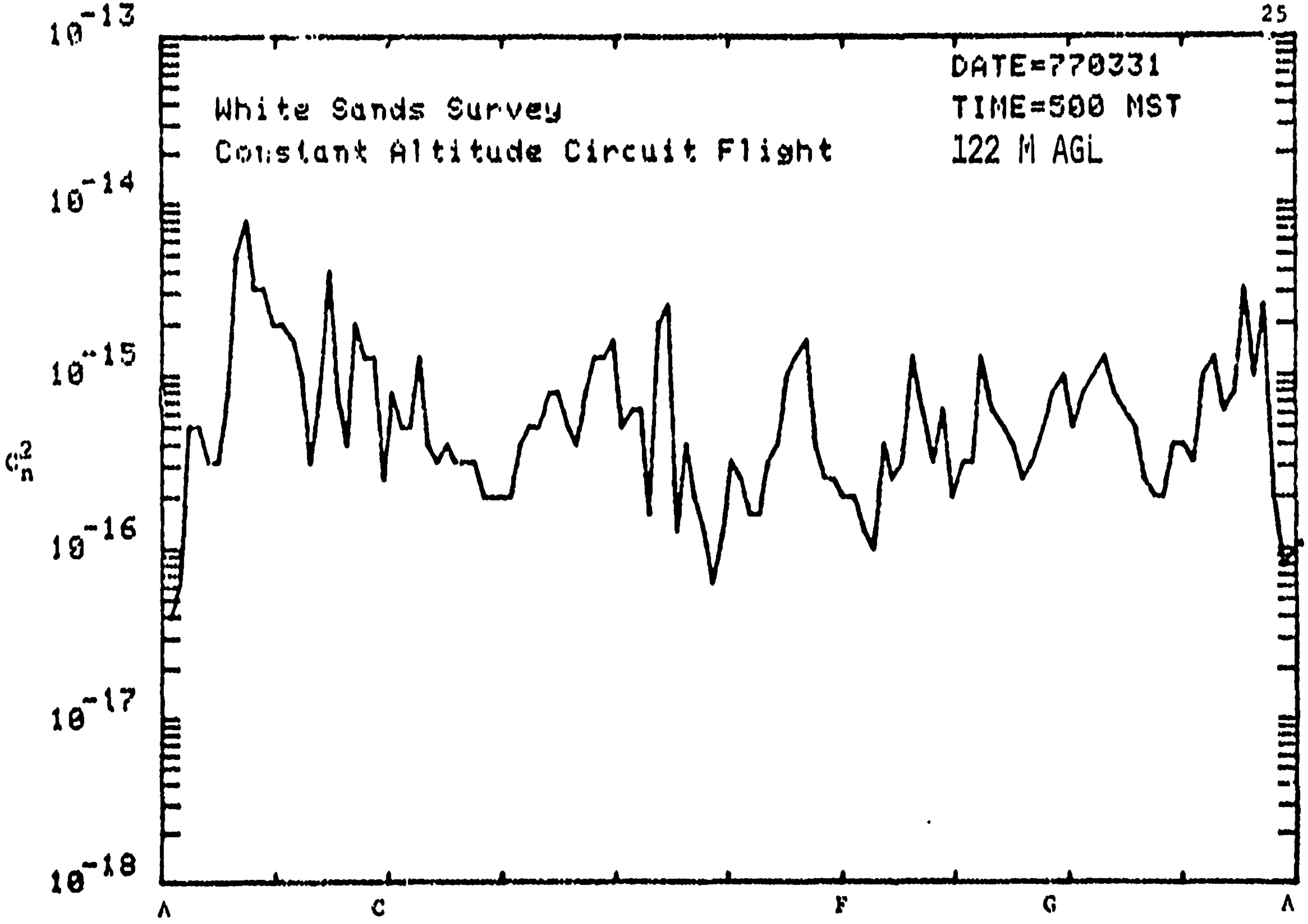
10^{-18}
C_n^2
A
D
F
G
A
25


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=500 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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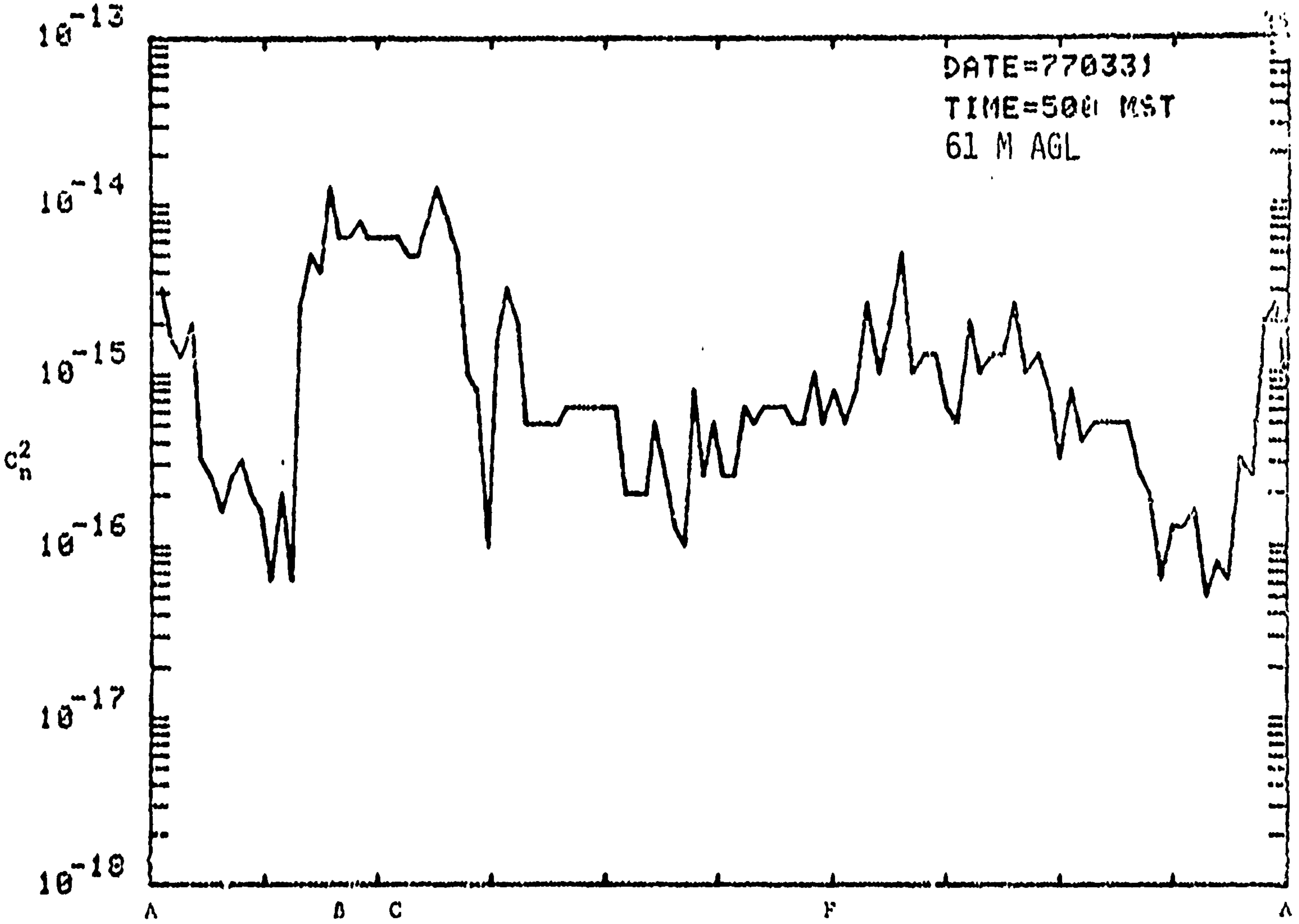
10^{-18}
25
A
C
F
G
A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TIME=500 MST
61 M AGL
C_n^2
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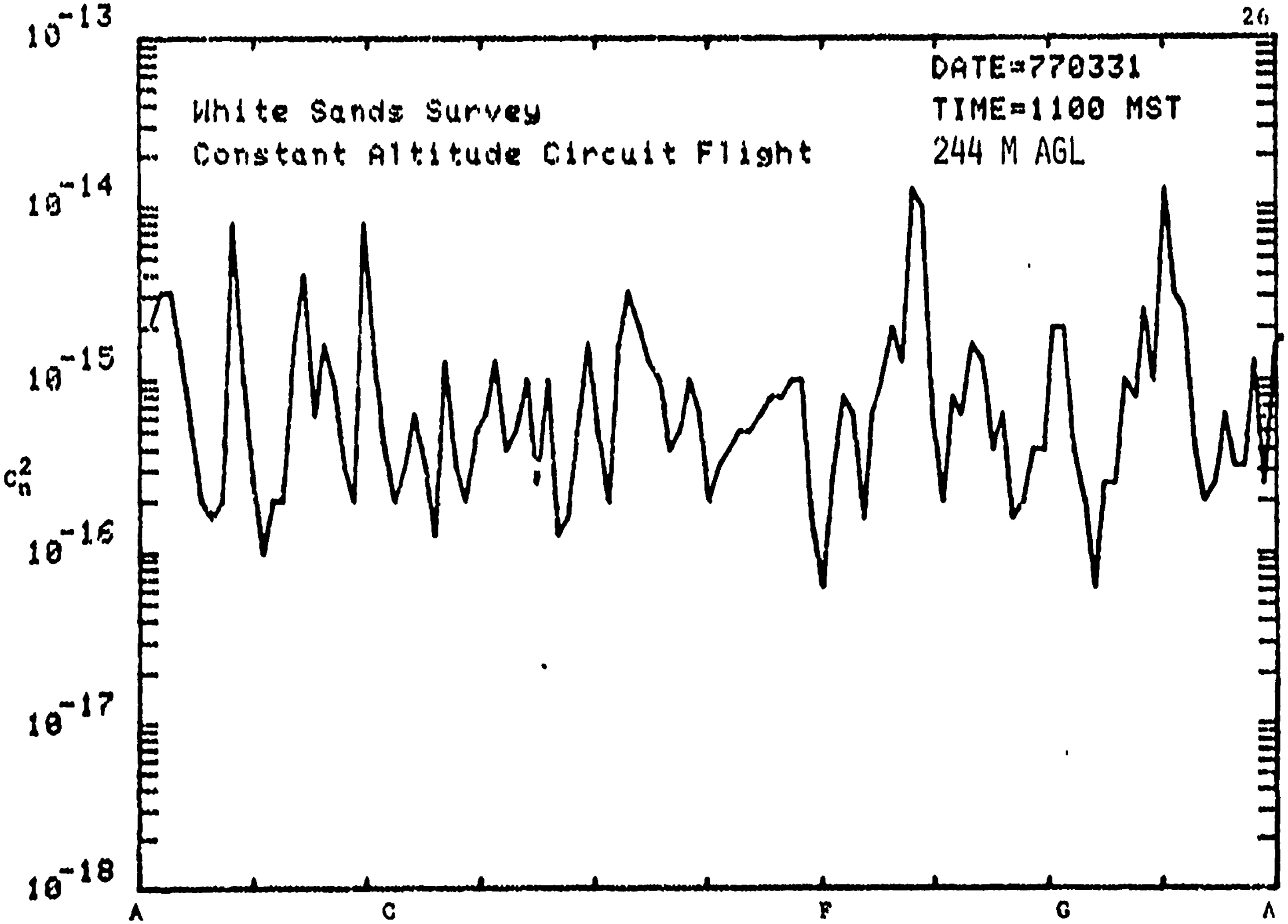
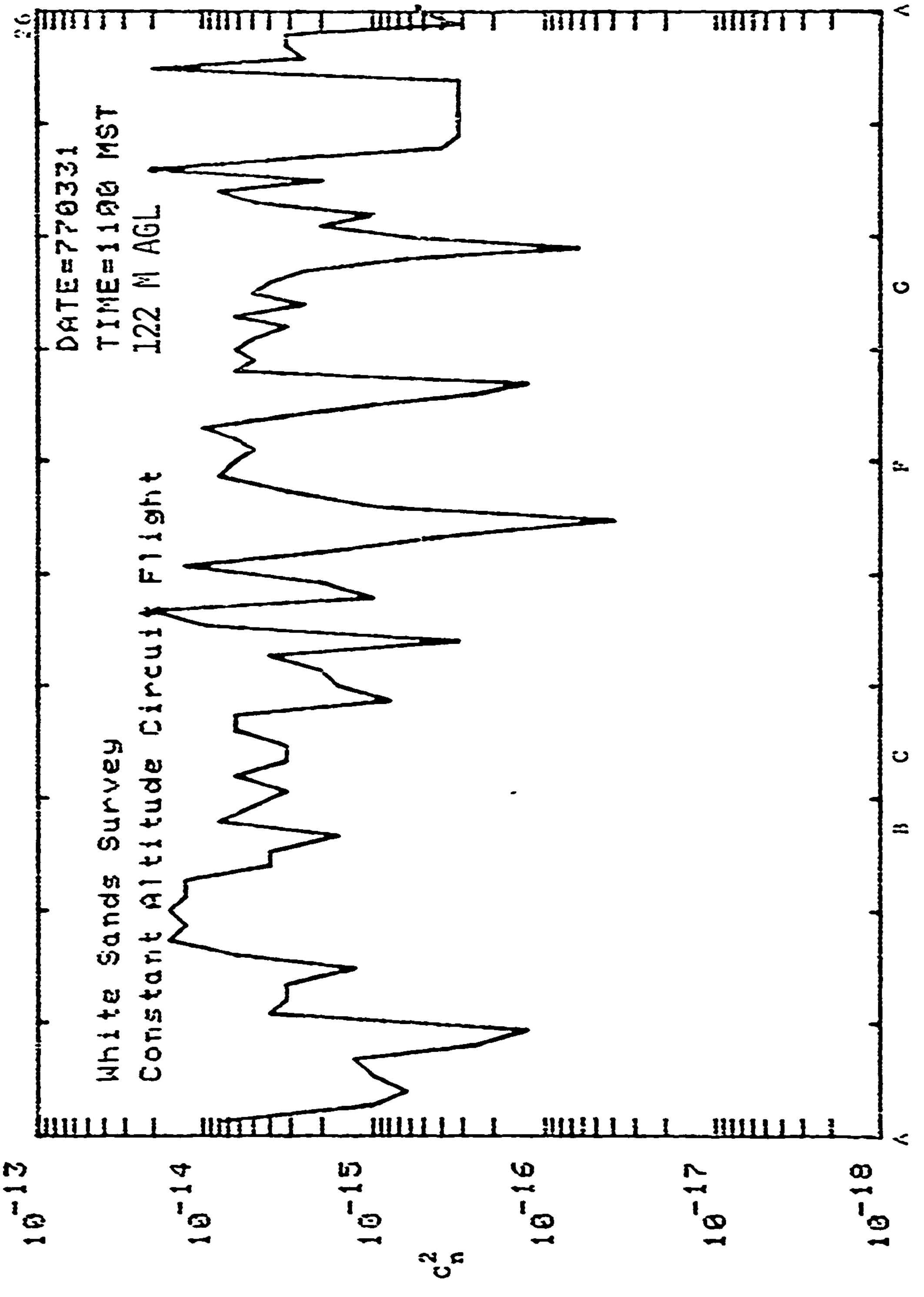
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
B
C
F
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=1100 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
C
F
G
A
26


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=1100 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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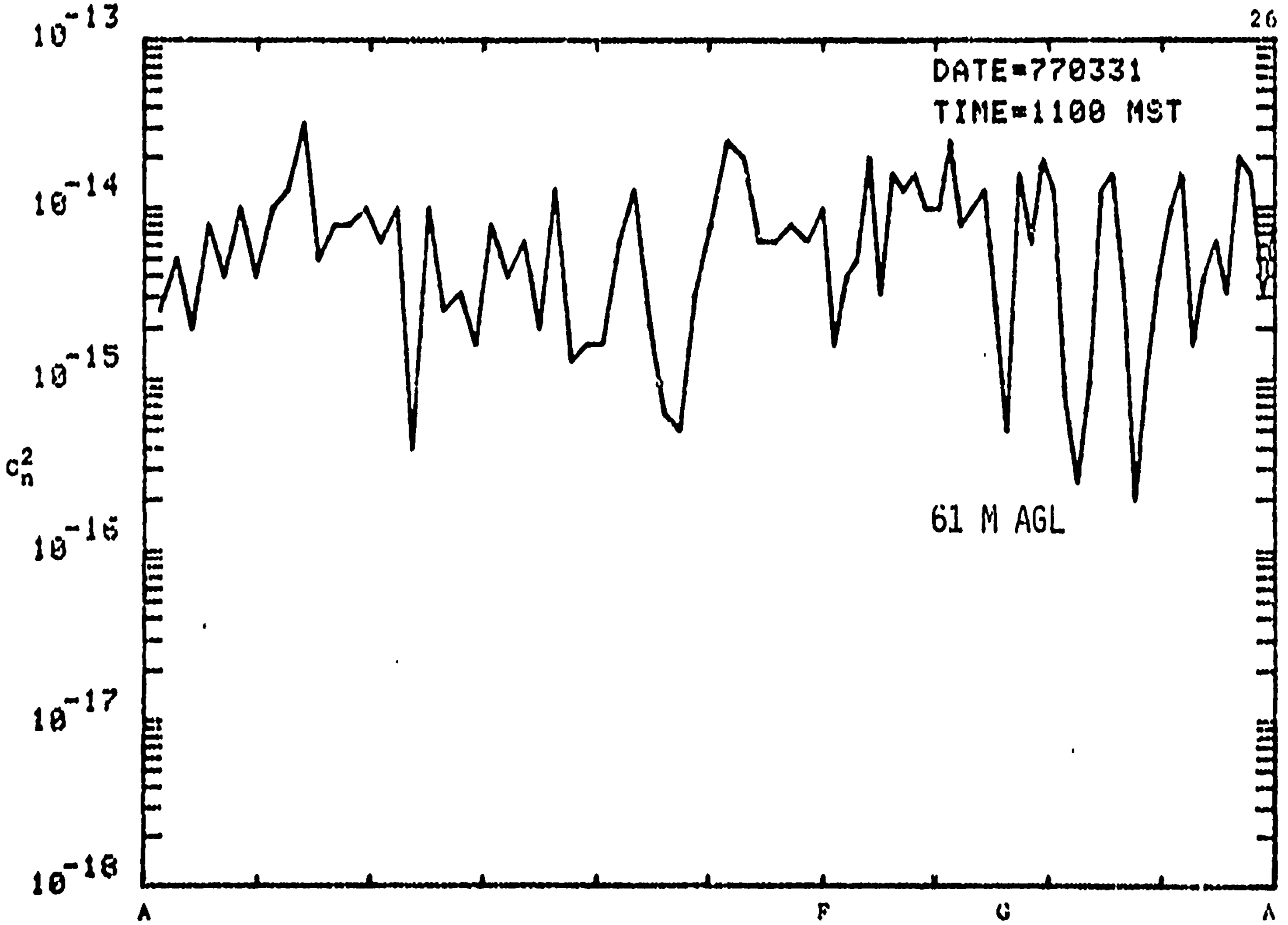
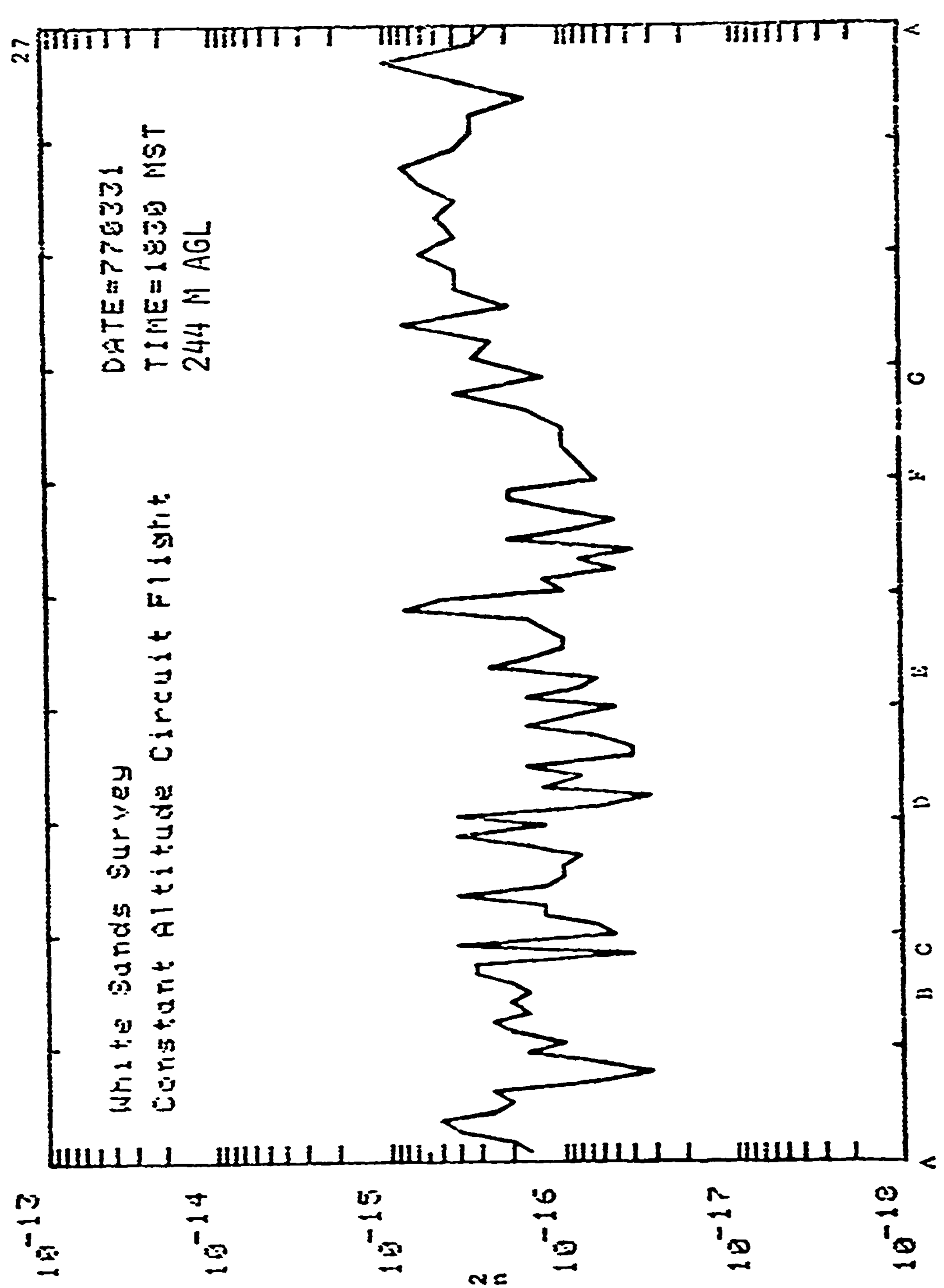
A
B
C
F
G
A


10^-13
10^-14
10^-15
10^-16
10^-17
10^-18
c_n^2
DATE=770331
TIME=1100 MST
61 M AGL
26
A
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=1830 MST
244 M AGL
27
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
10^{-17}
10^{-18}
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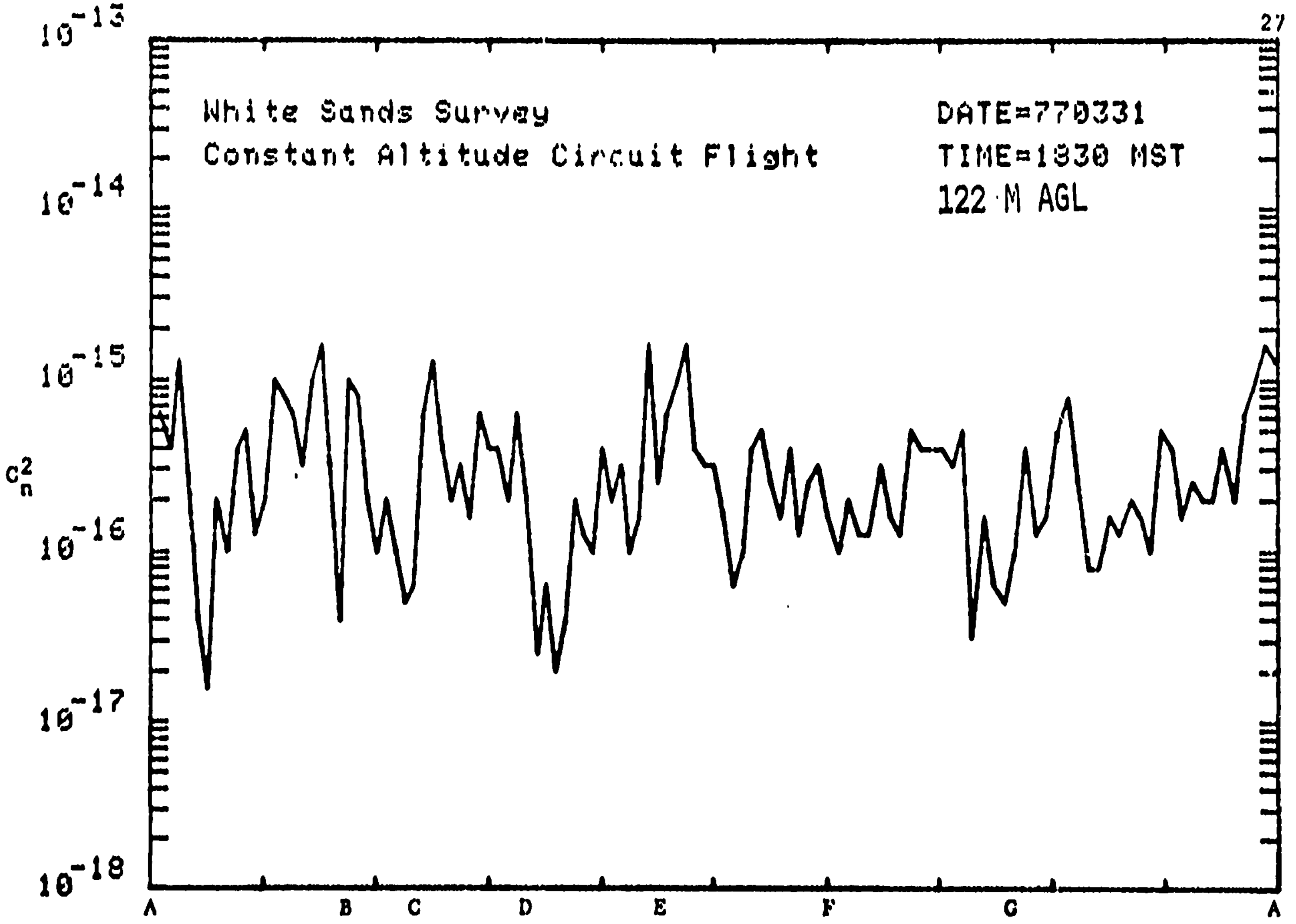
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=1830 MST
122 M AGL
27
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
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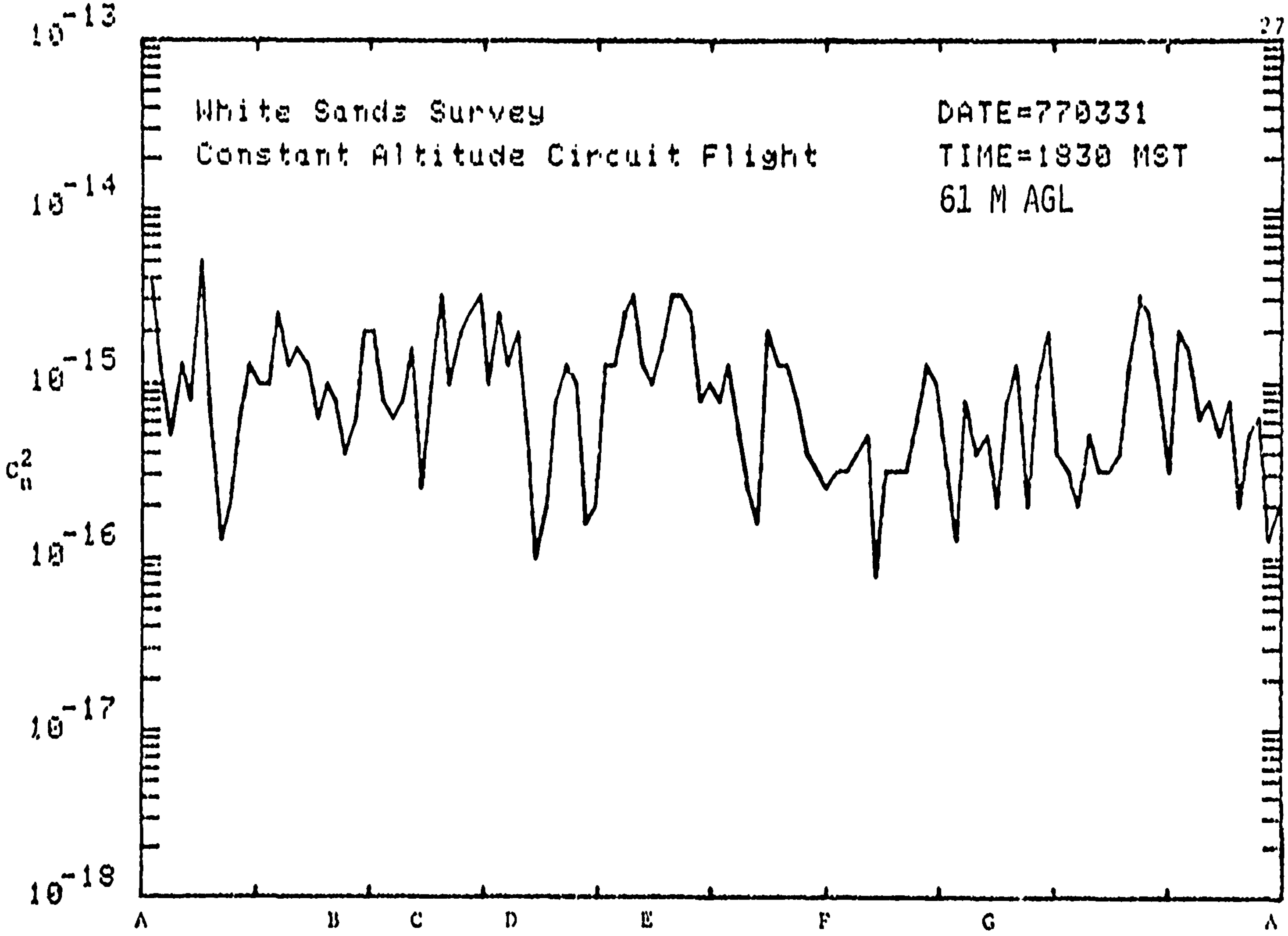
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770331
TIME=1830 MST
61 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
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10^{-18}
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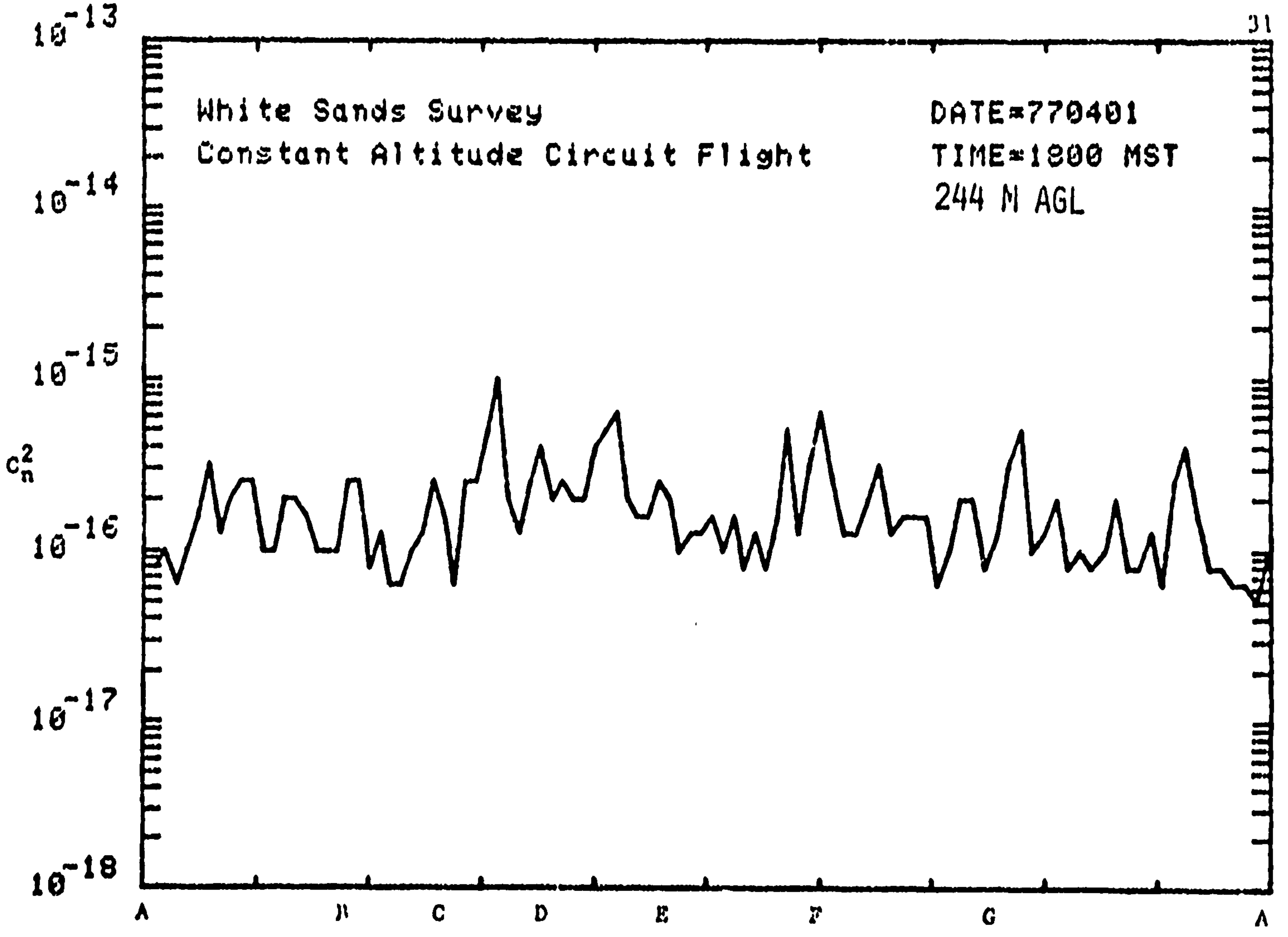
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770401
TIME=1800 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
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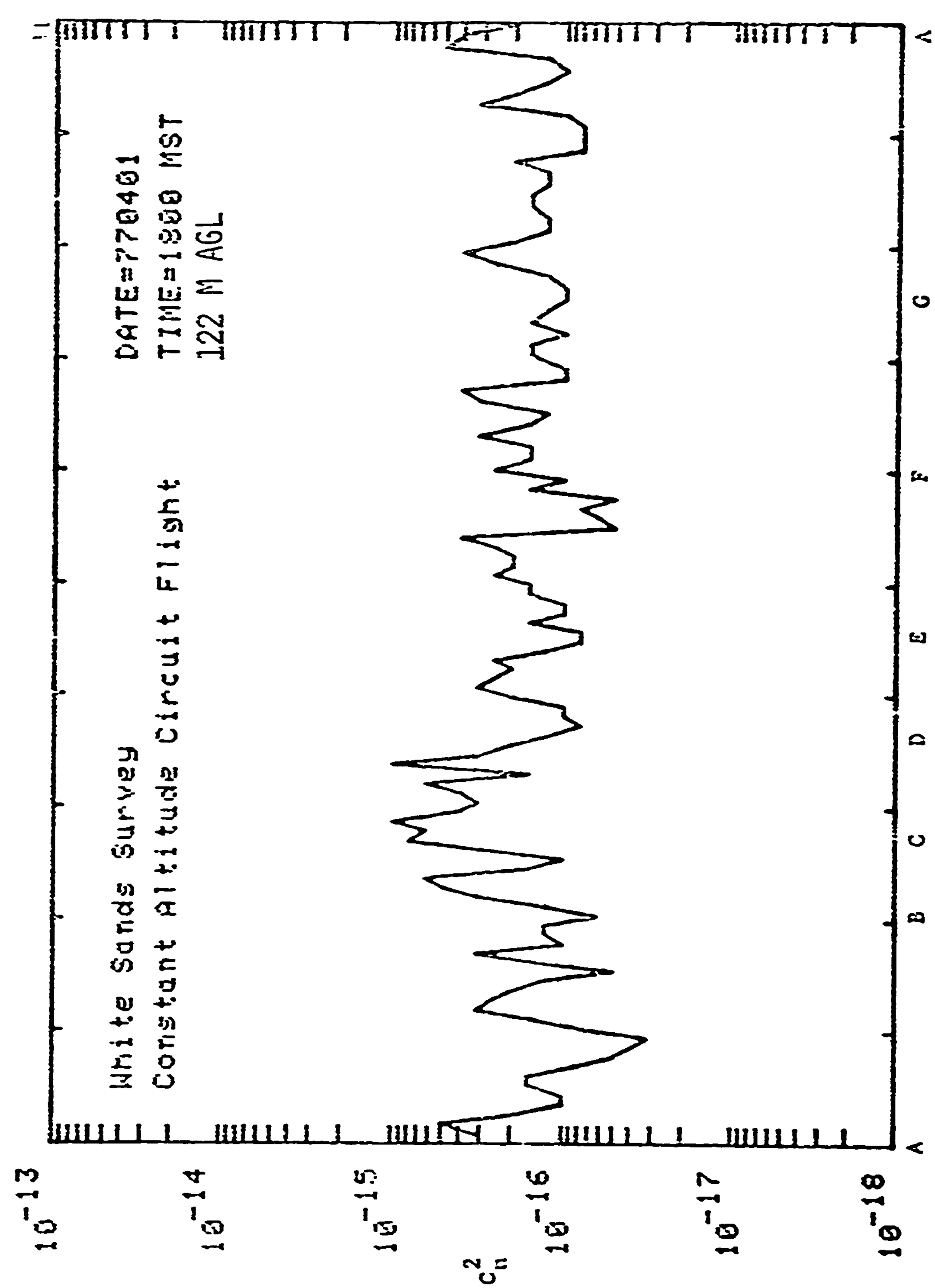
B
C
D
E
F
G
A
31


White Sands Survey
Constant Altitude Circuit Flight
DATE=770401
TIME=1900 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
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10^{-18}
C_n^2
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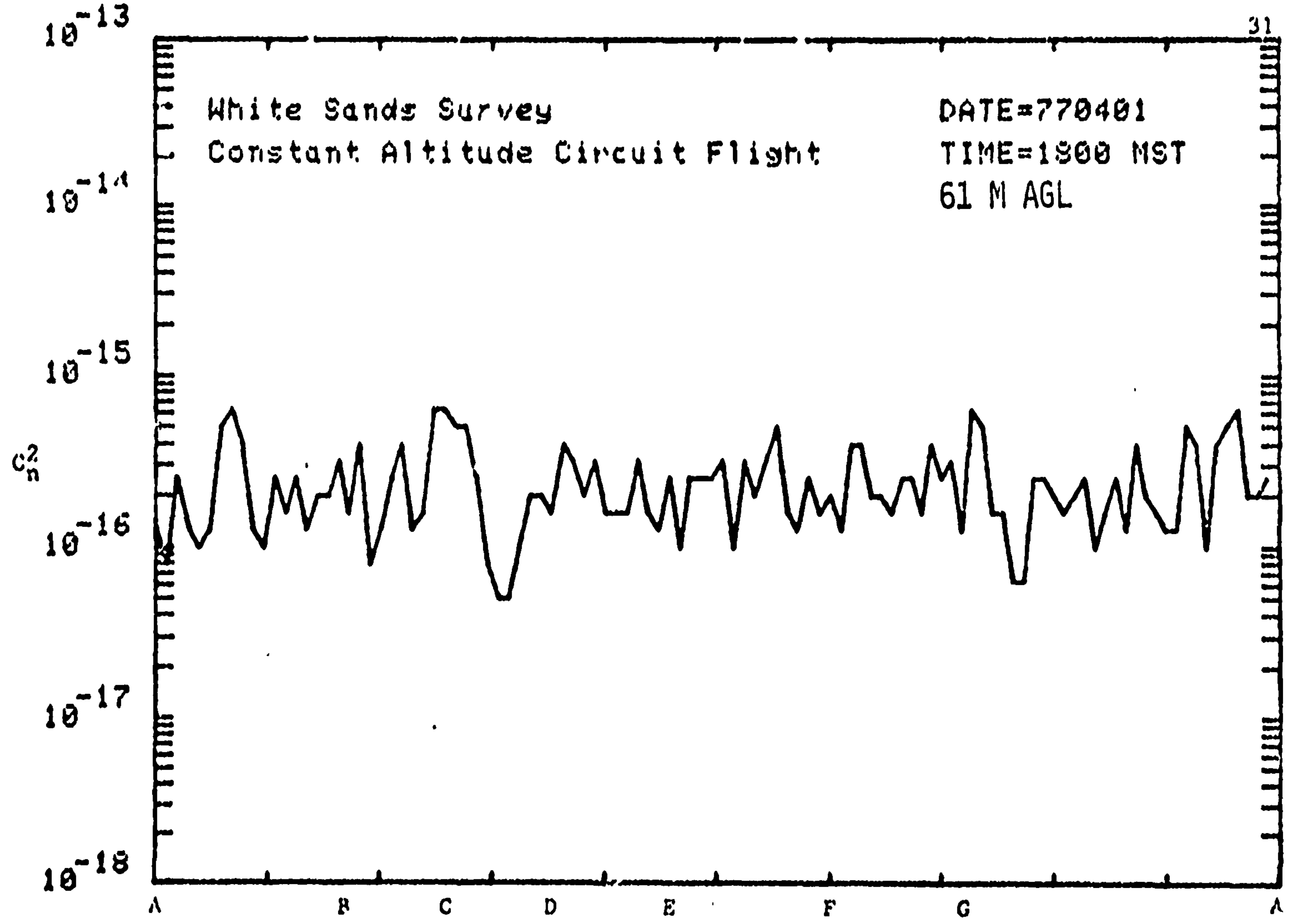
C
D
E
F
G
A


10^-13
10^-14
10^-15
10^-16
10^-17
10^-18
C_n^2
White Sands Survey
Constant Altitude Circuit Flight
DATE=770401
TIME=1900 MST
61 M AGL
31
A
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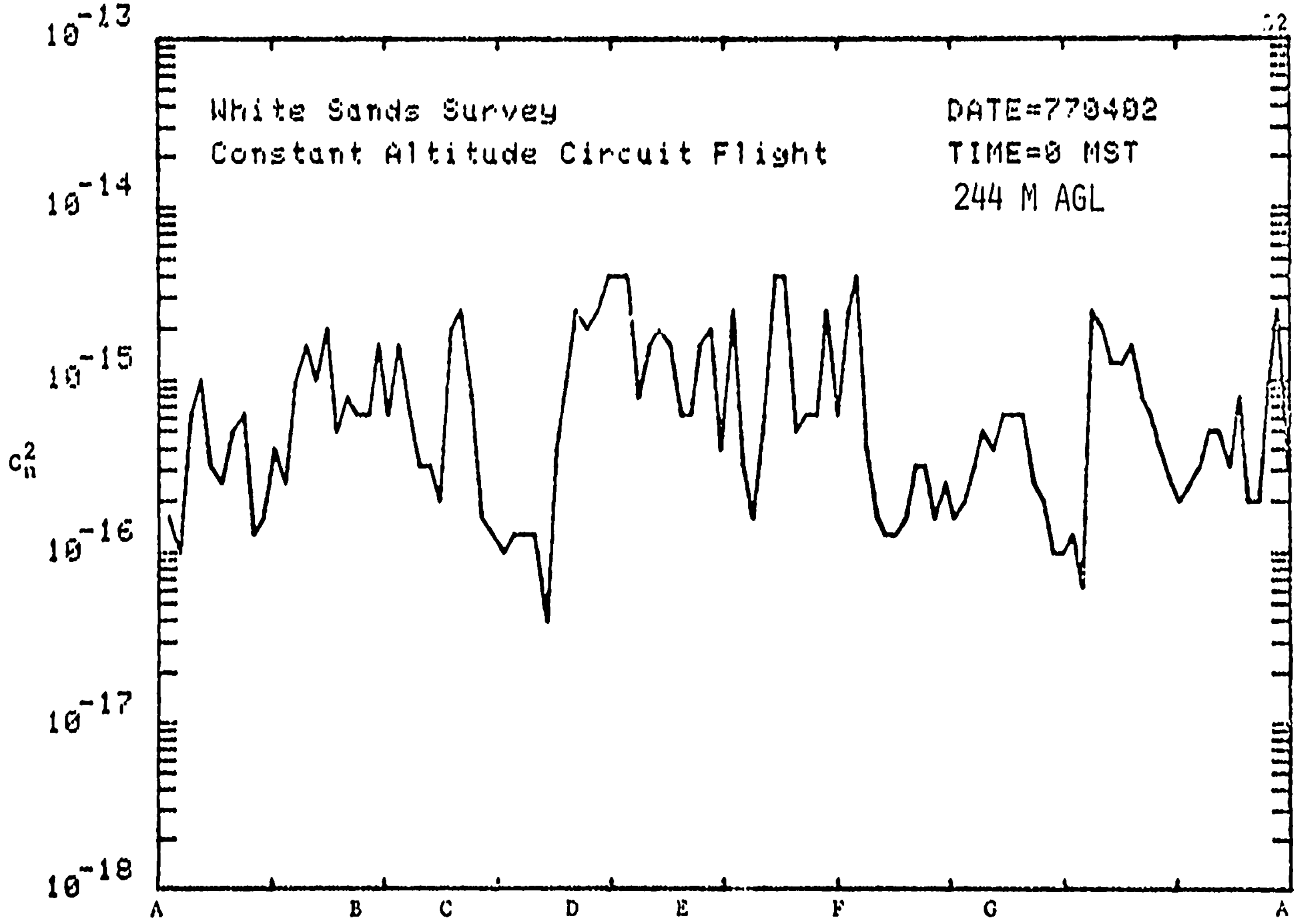
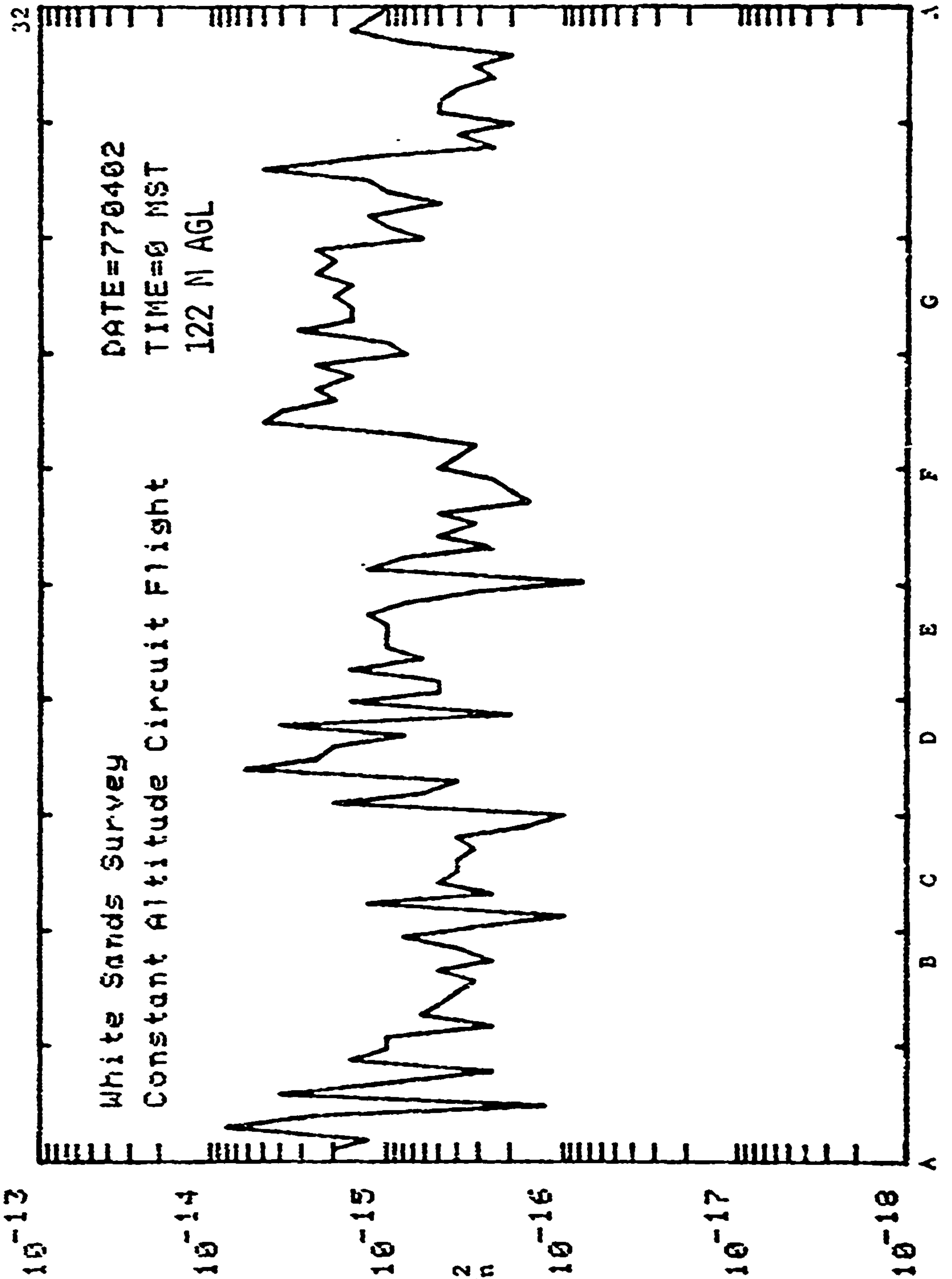
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=0 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A
22


White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=0 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-17}
10^{-18}
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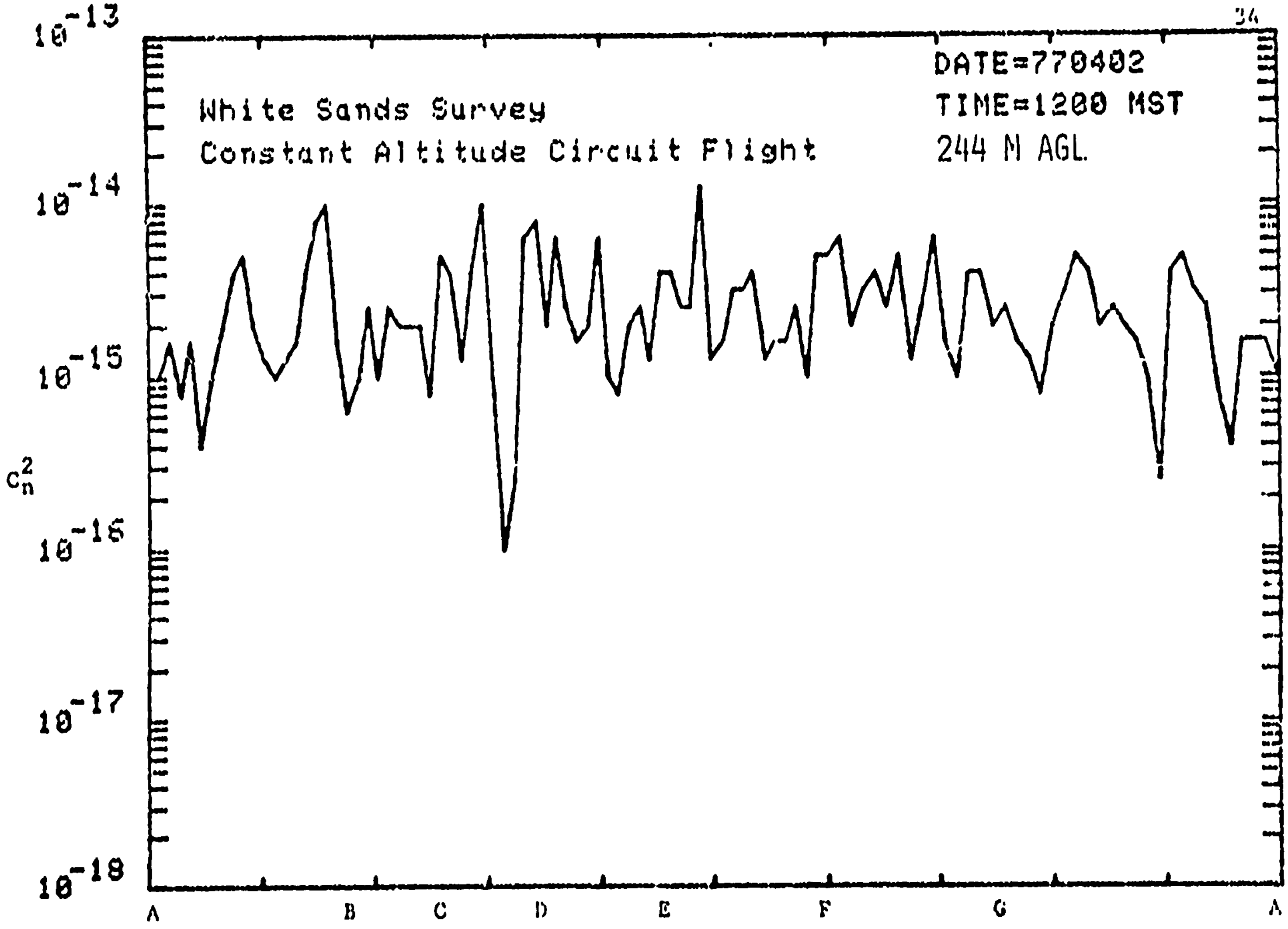
C
D
E
F
G
A
32

34
White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=1200 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-18}
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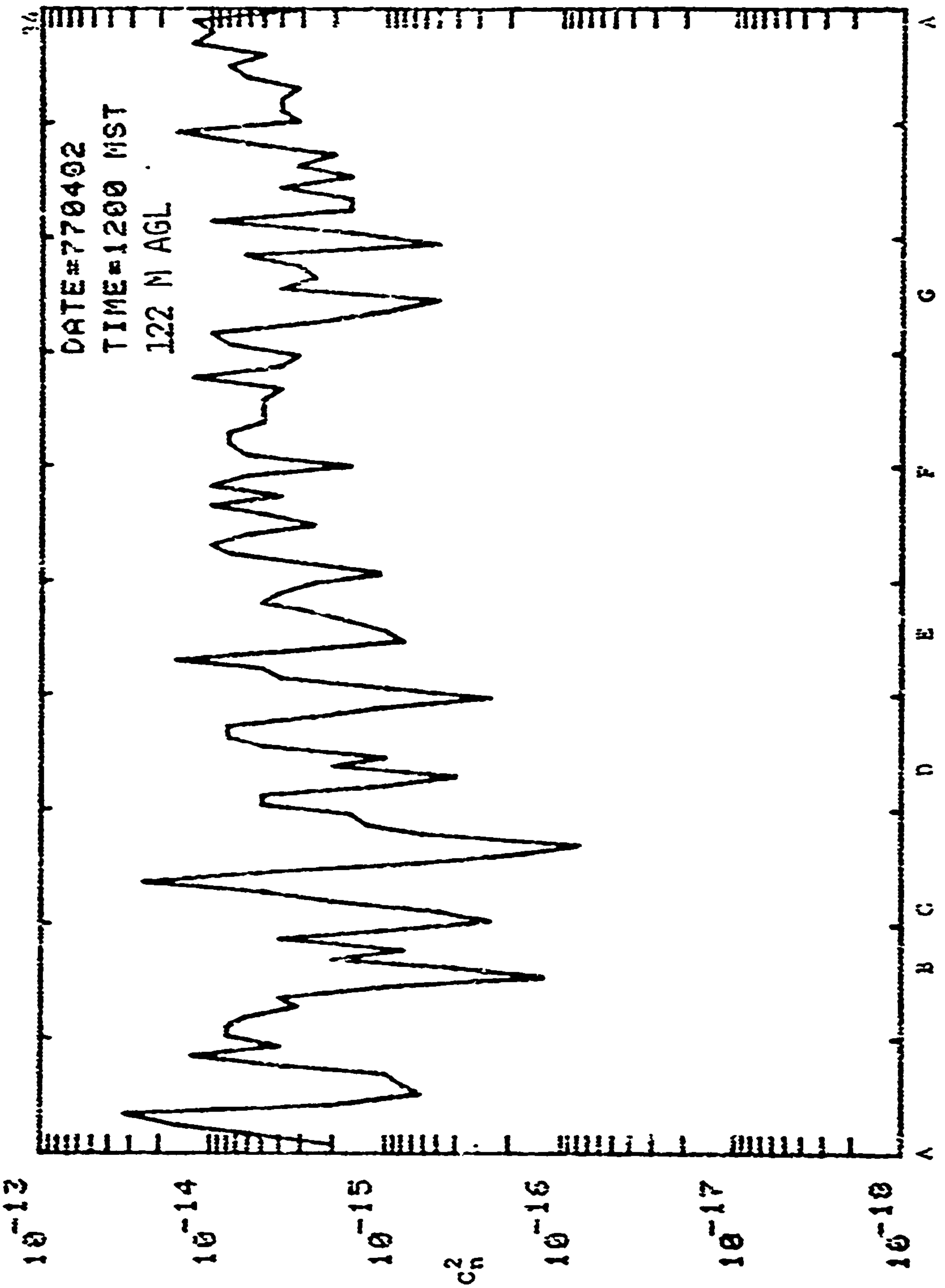
C
D
E
F
G
A


DATE=770402
TIME=1200 MST
122 M AGL
C_n^2
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10^{-14}
10^{-15}
10^{-16}
10^{-17}
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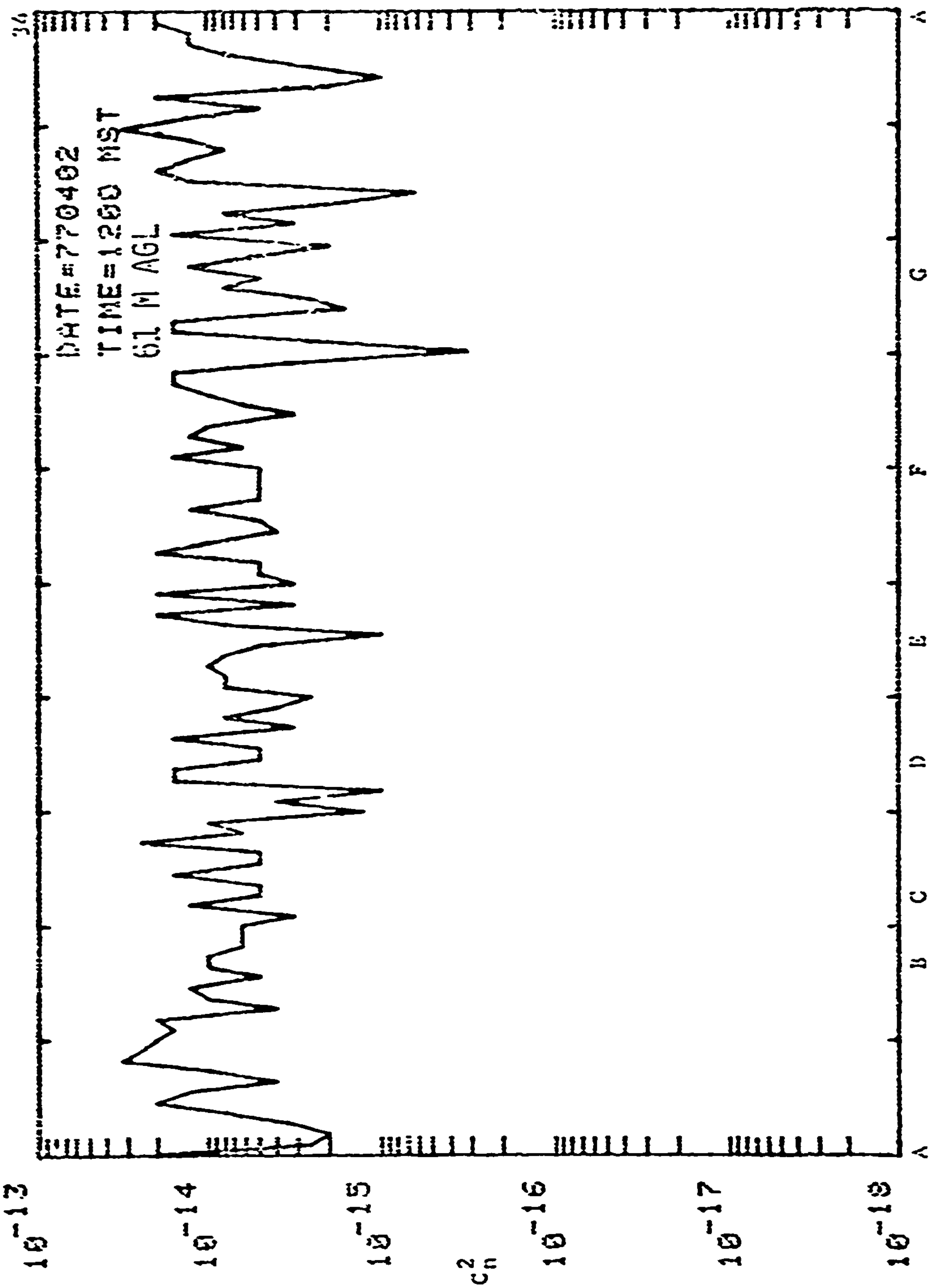
D
E
F
G
A
24


DATE=770402
TIME=1200 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
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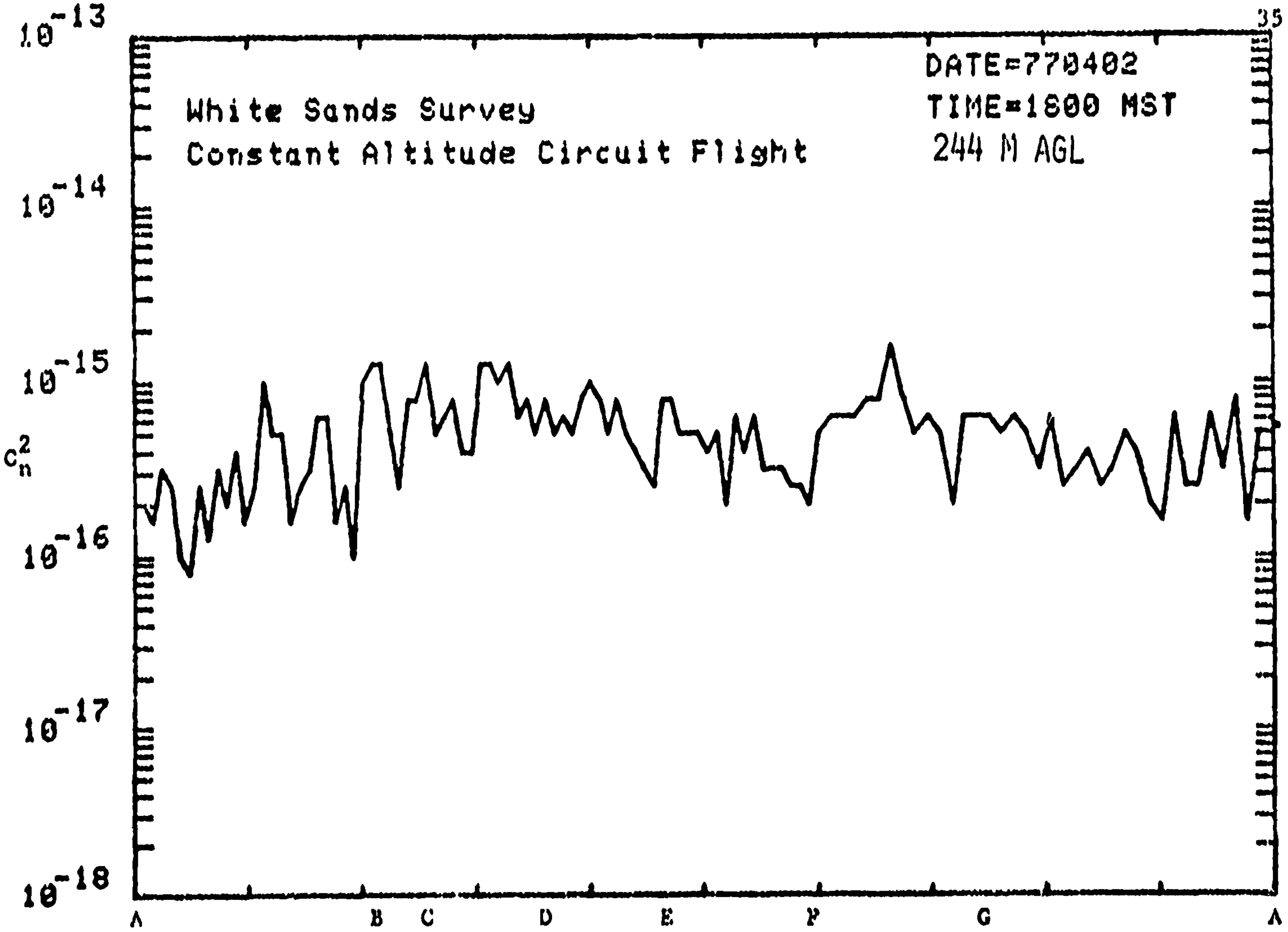
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=1800 MST
244 M AGL
35
10^{-13}
10^{-14}
10^{-15}
C_n^2
10^{-16}
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10^{-18}
A
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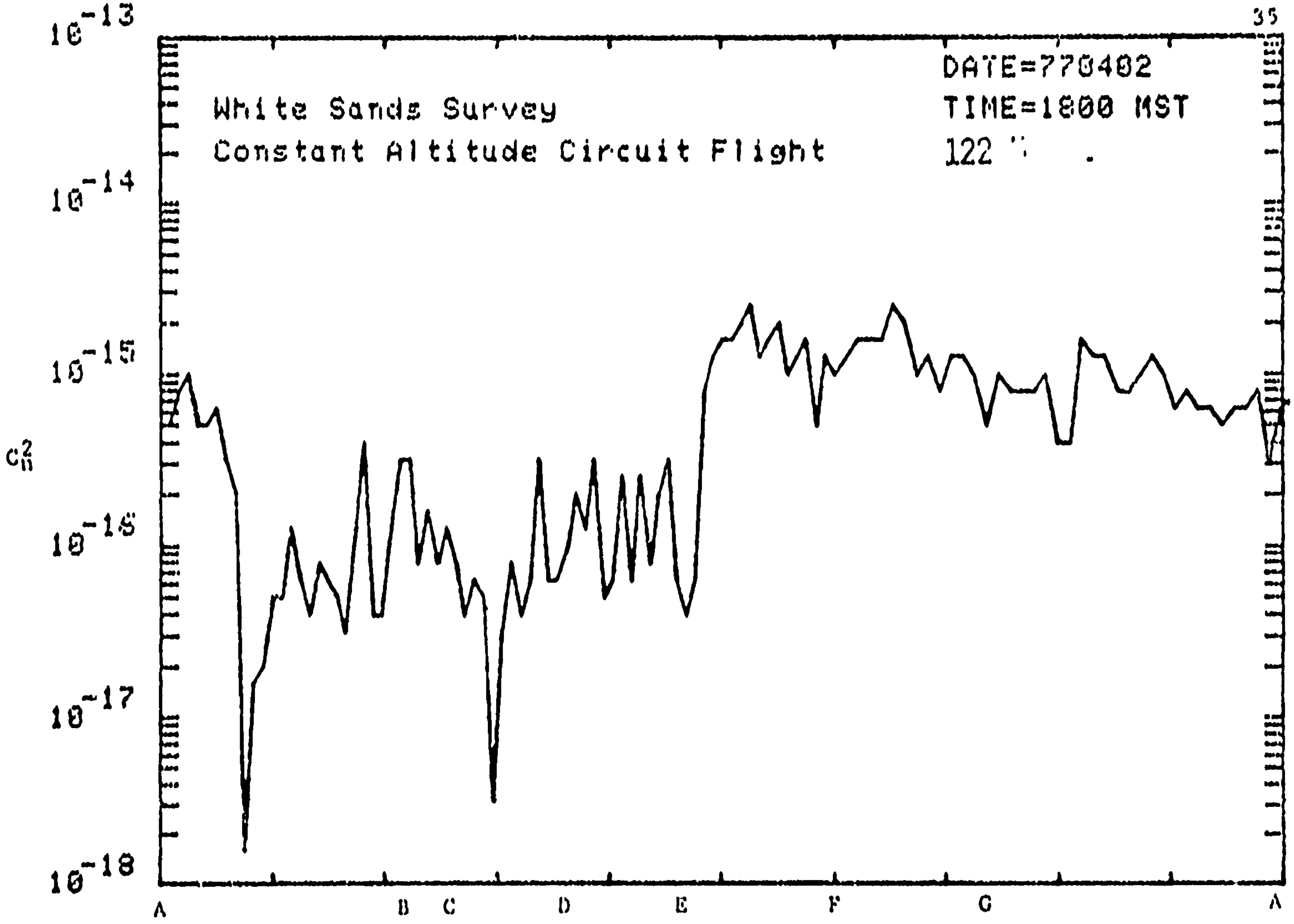
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=1800 MST
122
35
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
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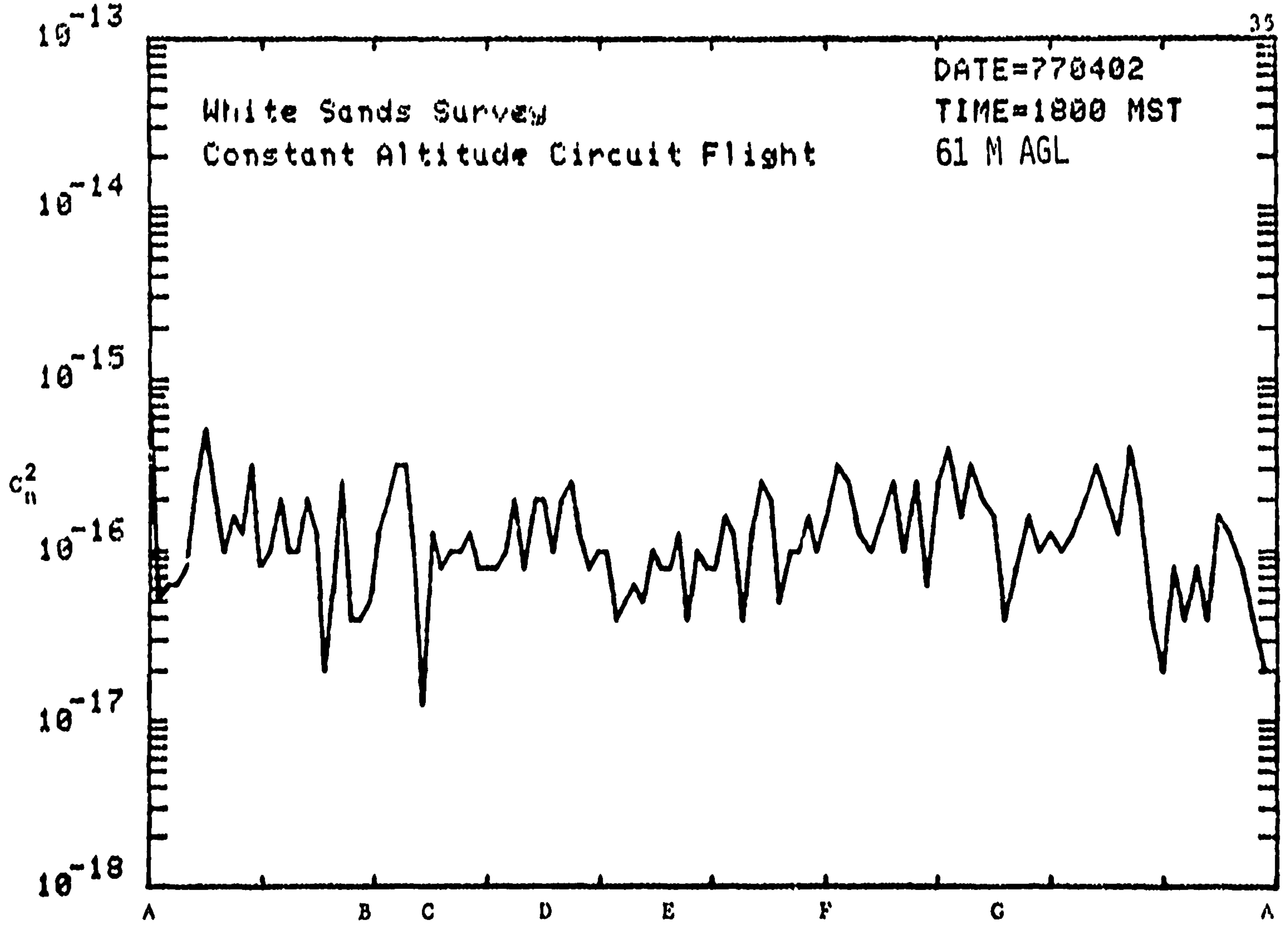
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770402
TIME=1800 MST
61 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-18}
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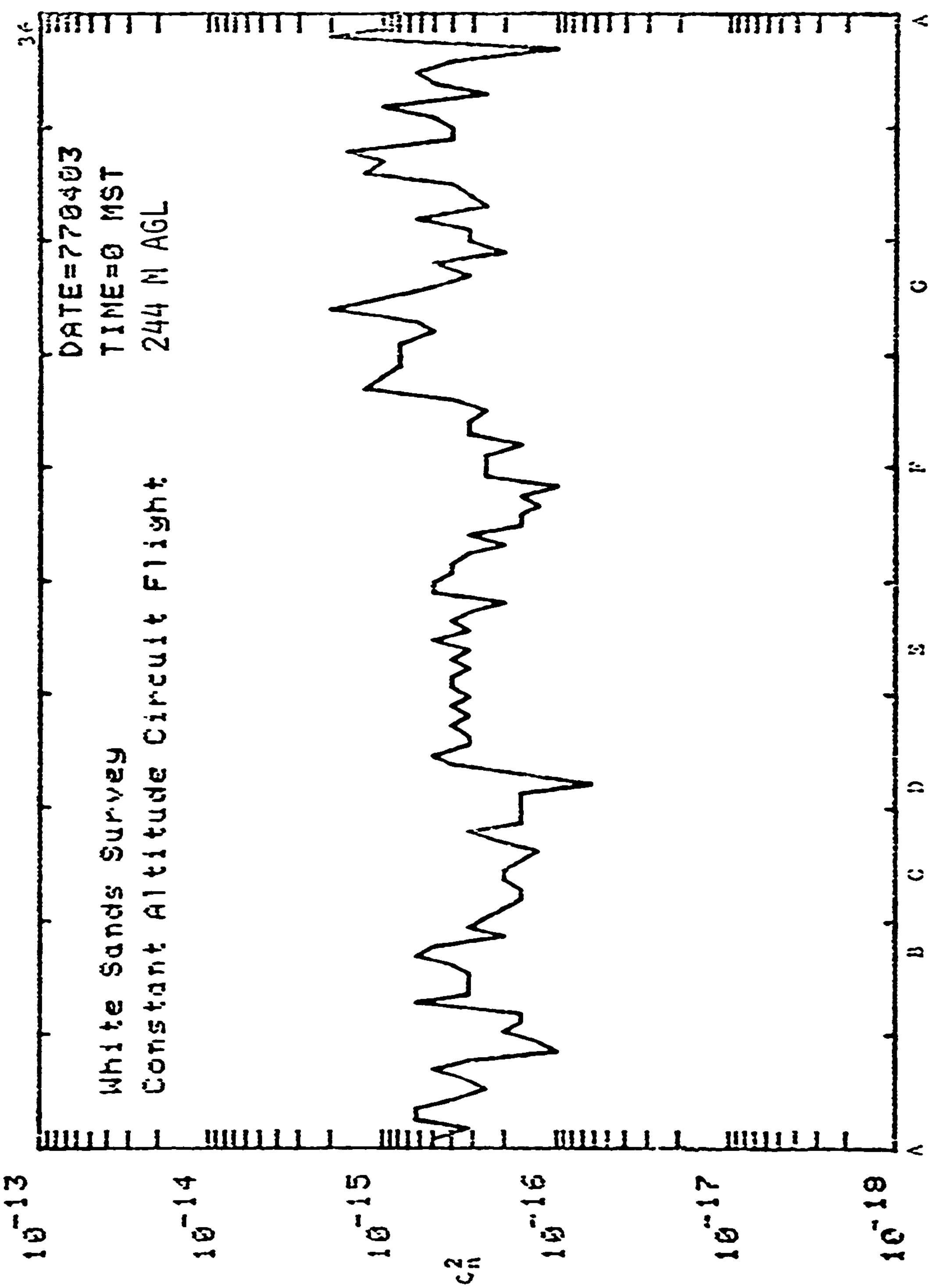
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=0 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
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10^{-18}
C_n^2
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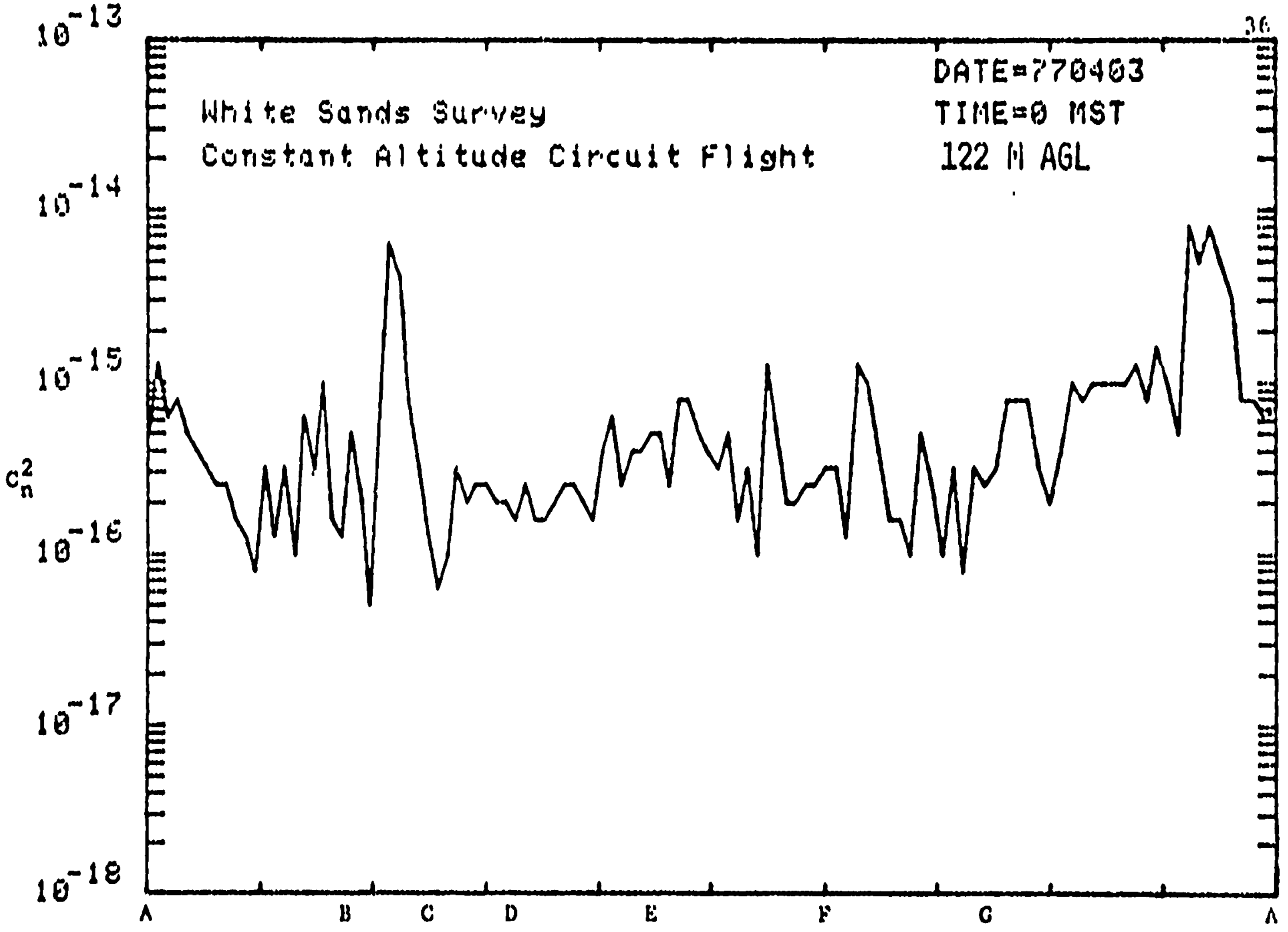
D
E
F
G
A
36


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=0 MST
122 M AGL
36
10^{-13}
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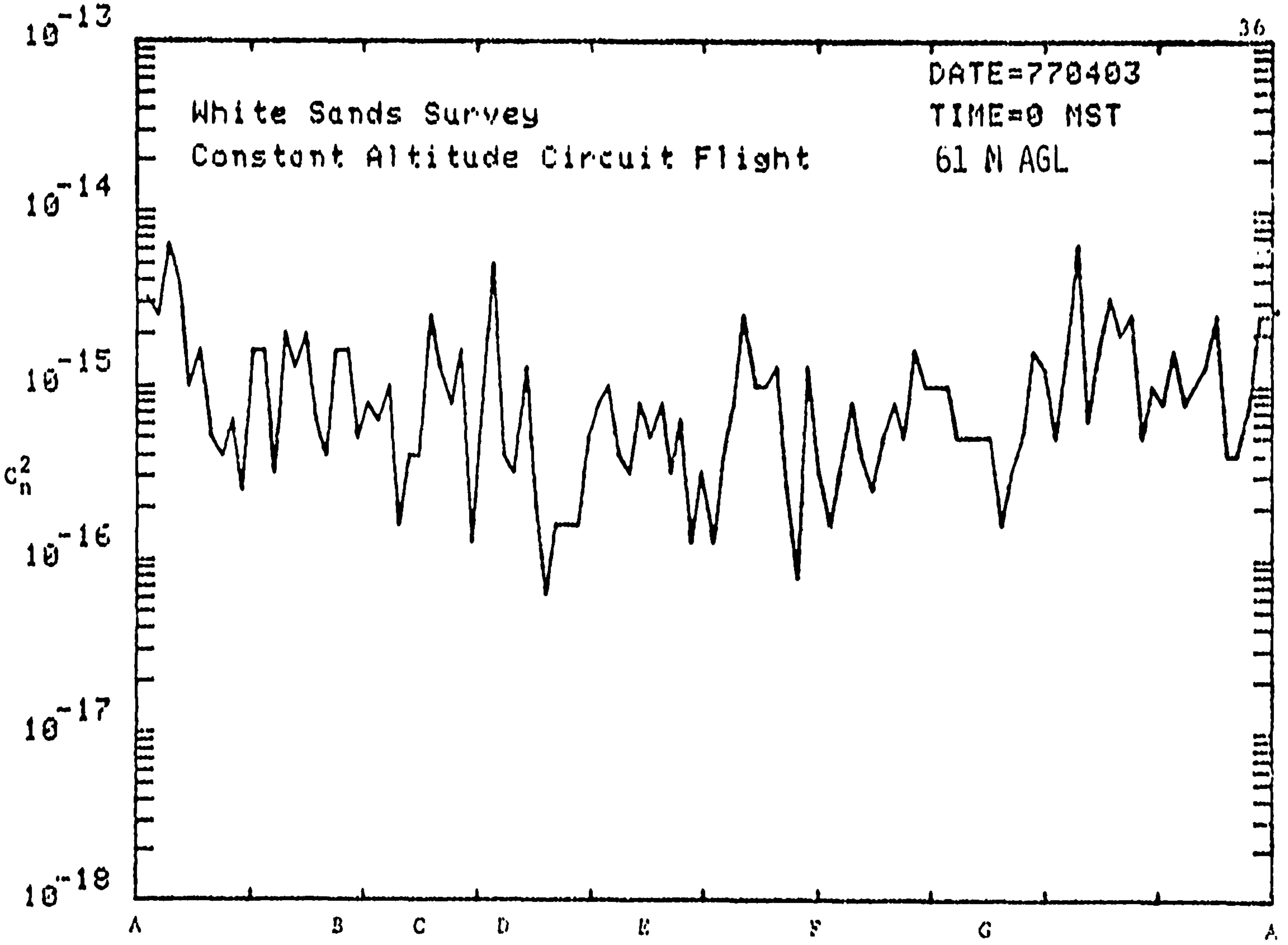
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


36
White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=0 MST
61 M AGL
10^{-13}
10^{-14}
10^{-15}
C_n^2
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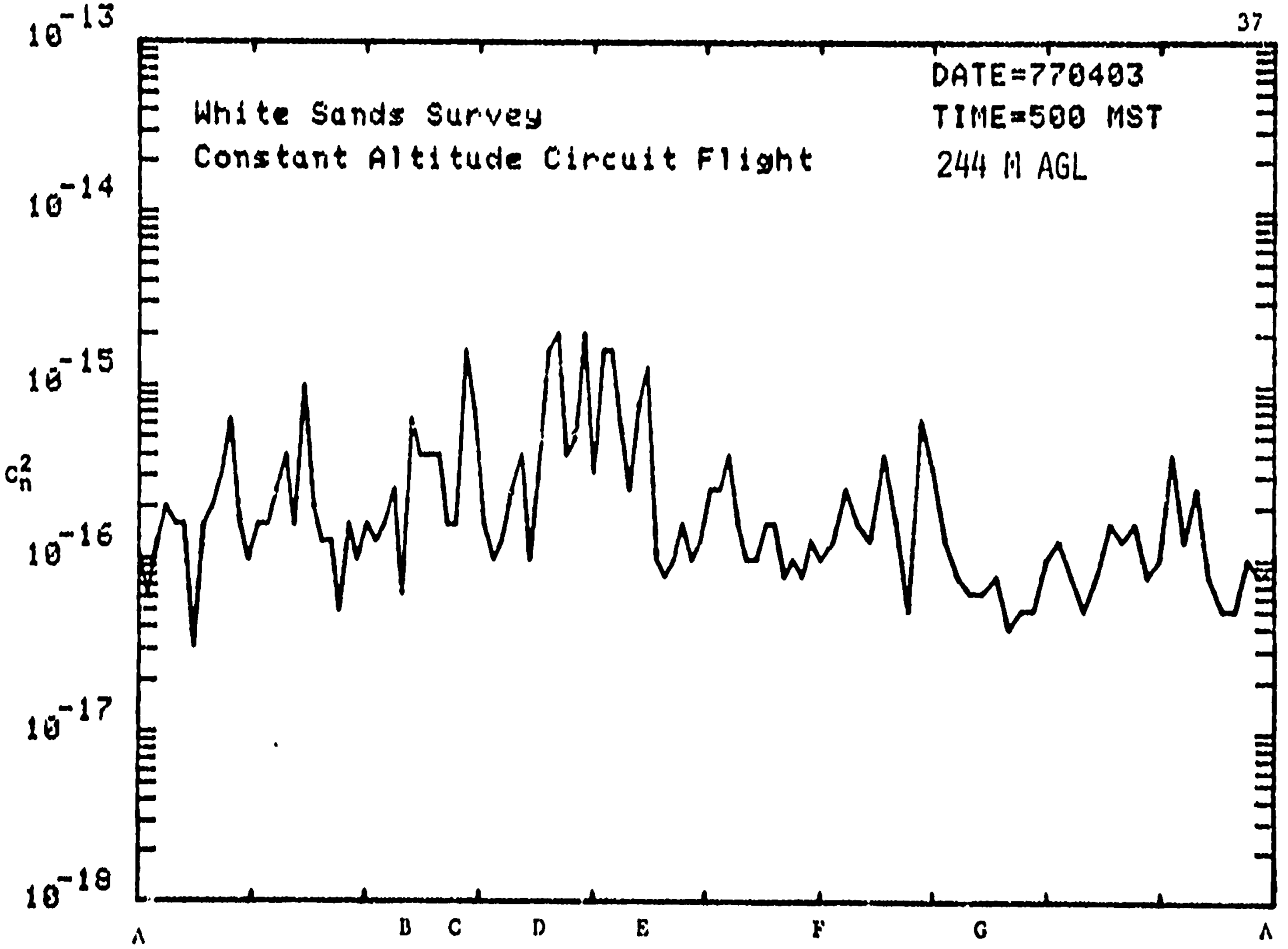
C
D
E
F
G
A


37
White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=500 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
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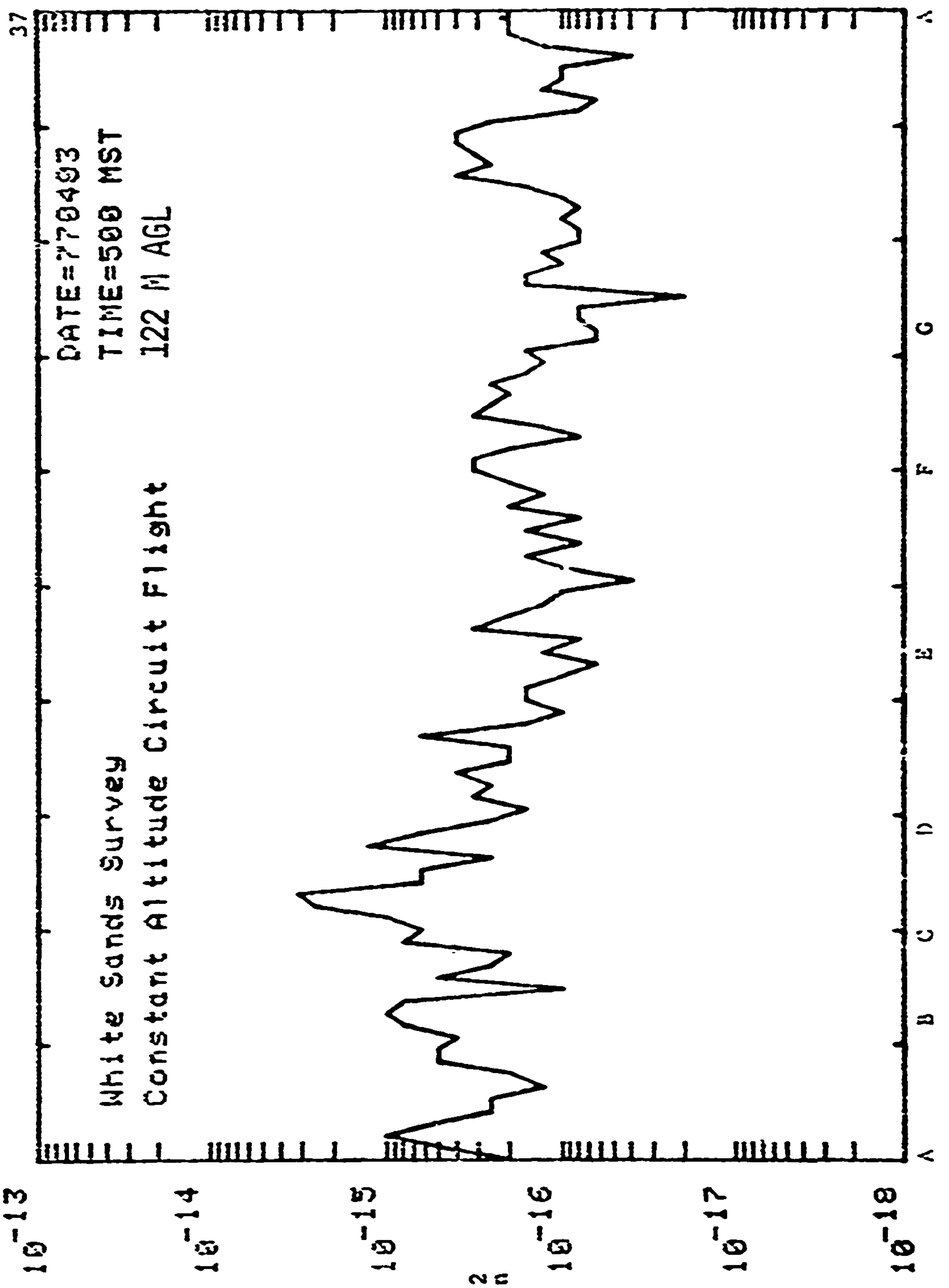
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=500 MST
122 M AGL
10^{-13}
10^{-14}
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10^{-16}
10^{-17}
10^{-18}
C_n^2
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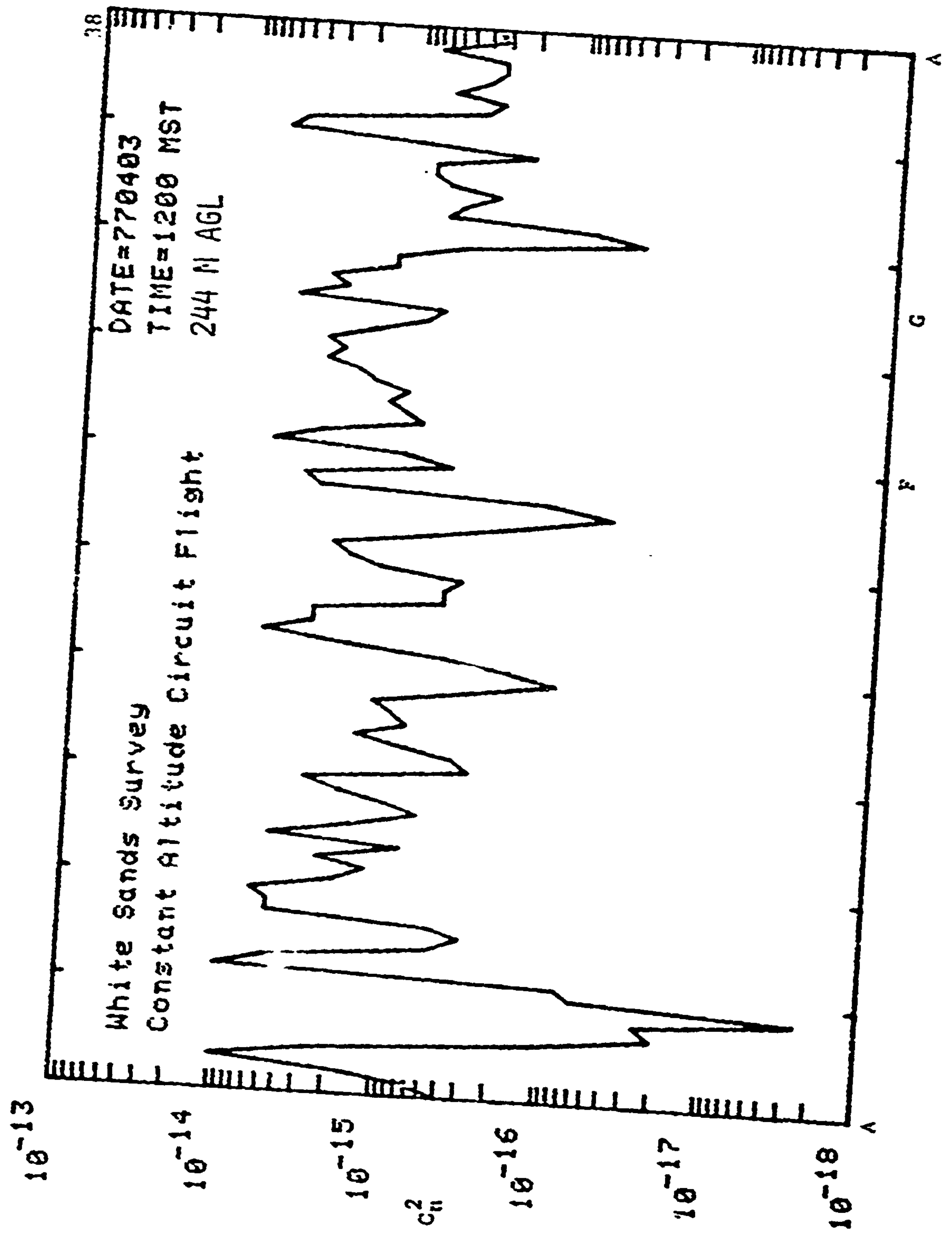
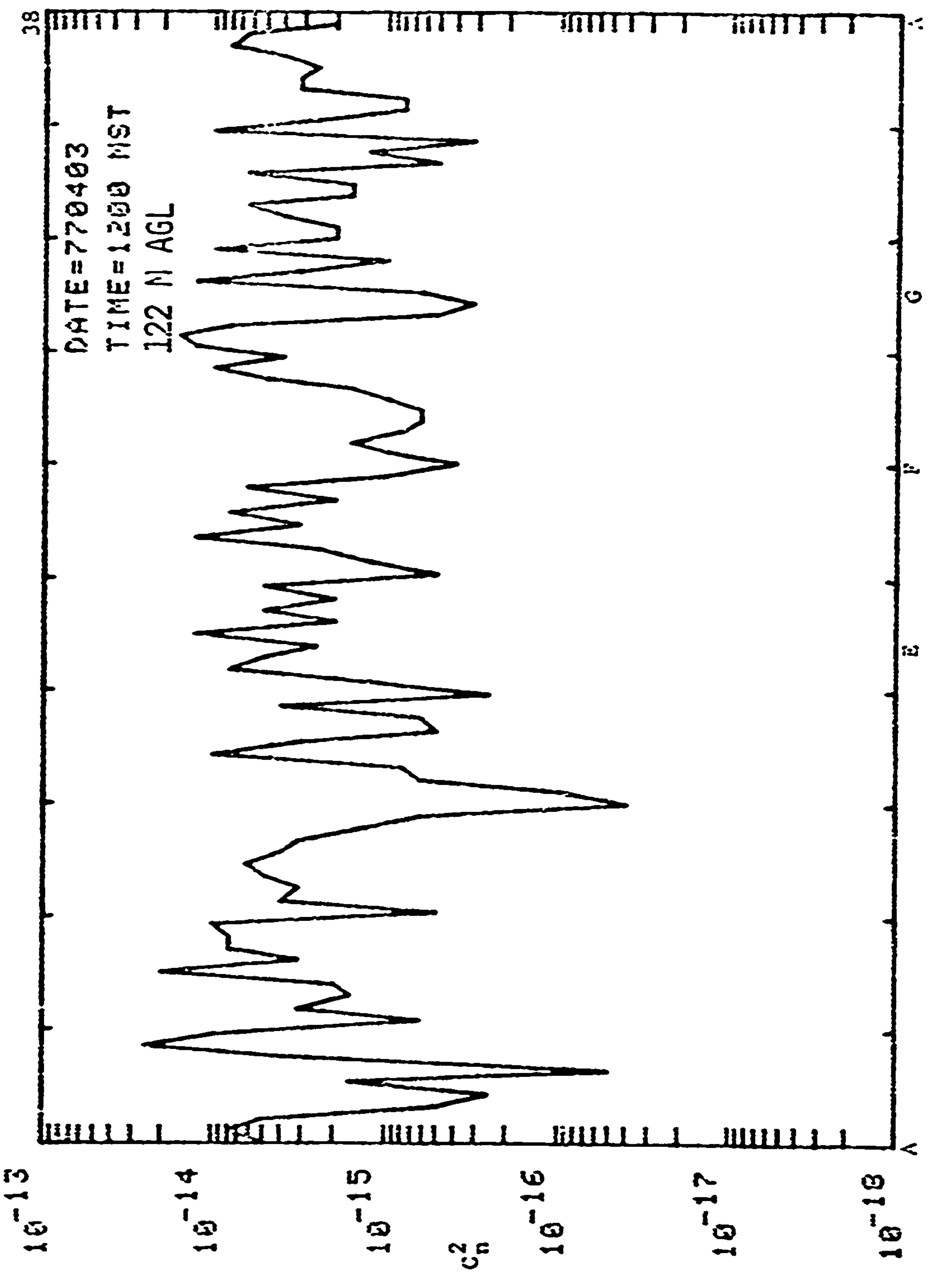
B
C
D
E
F
G
A
37


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=1200 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
F
G
A


DATE=770403
TIME=1200 MST
122 M AGL
10-13
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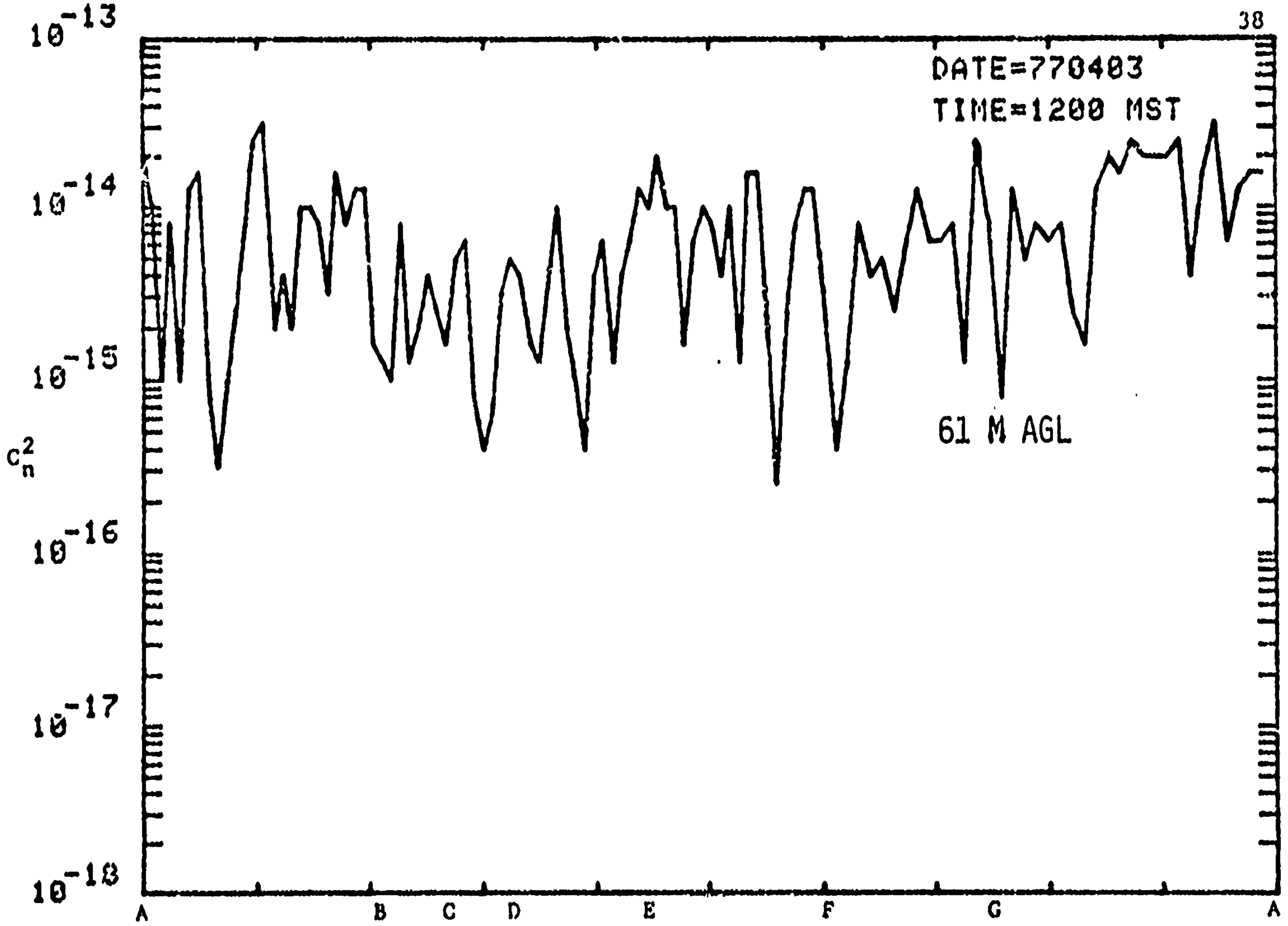
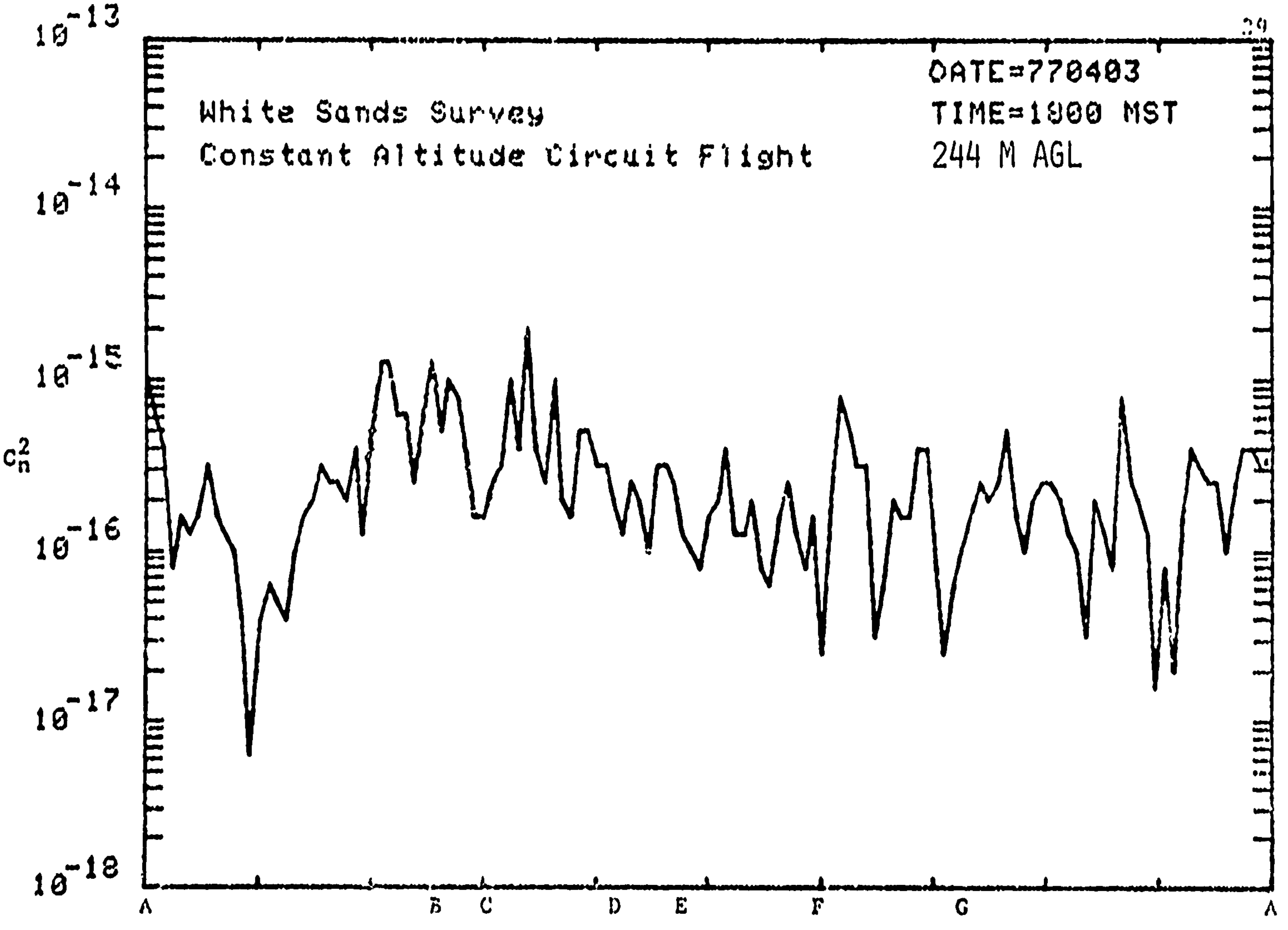
10-15
10-16
10-17
10-18
Cn2


10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
38
DATE=770403
TIME=1200 MST
61 M AGL
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=1800 MST
244 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
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10^{-18}
A
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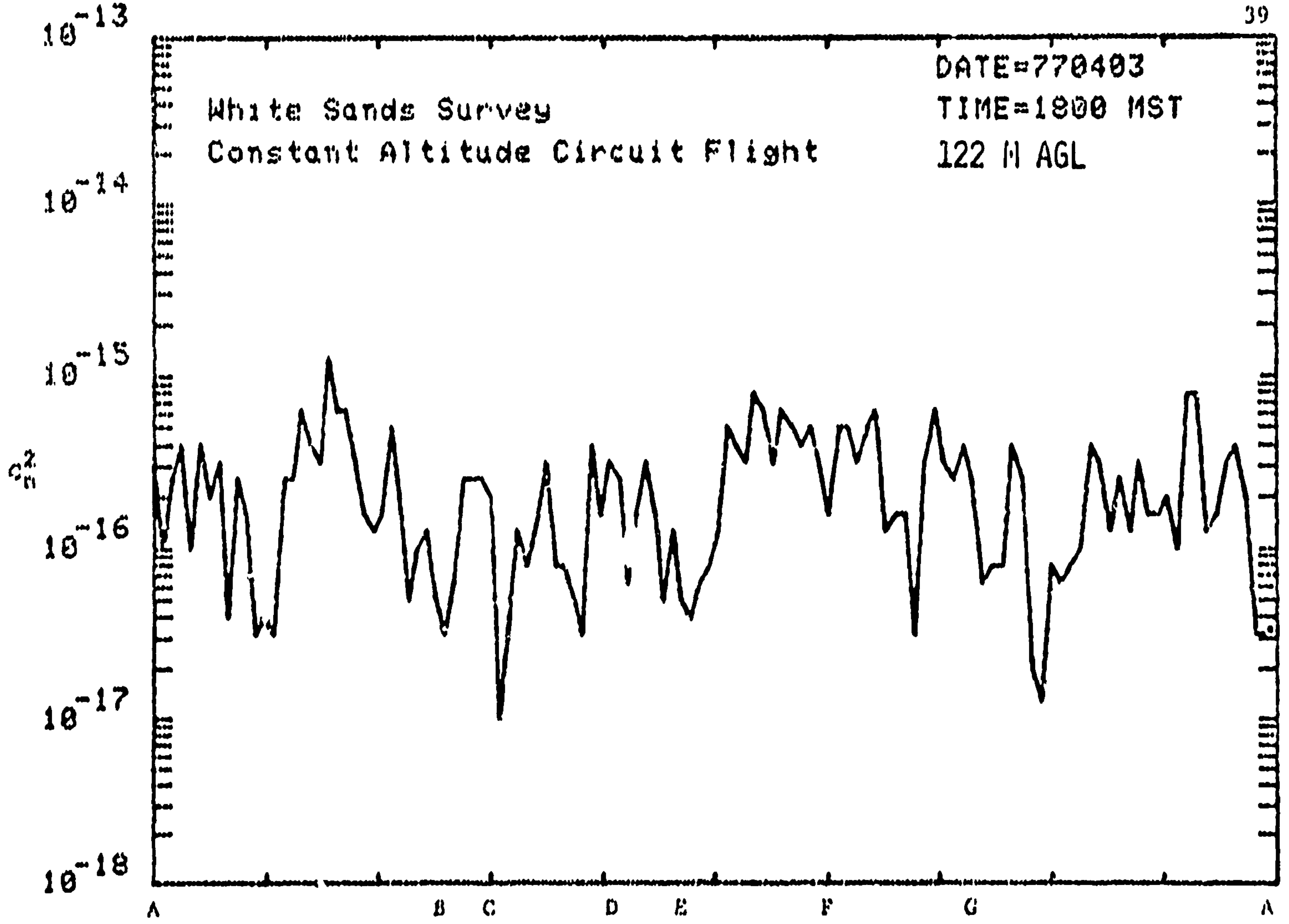
C
D
E
F
G
A


39
White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=1800 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
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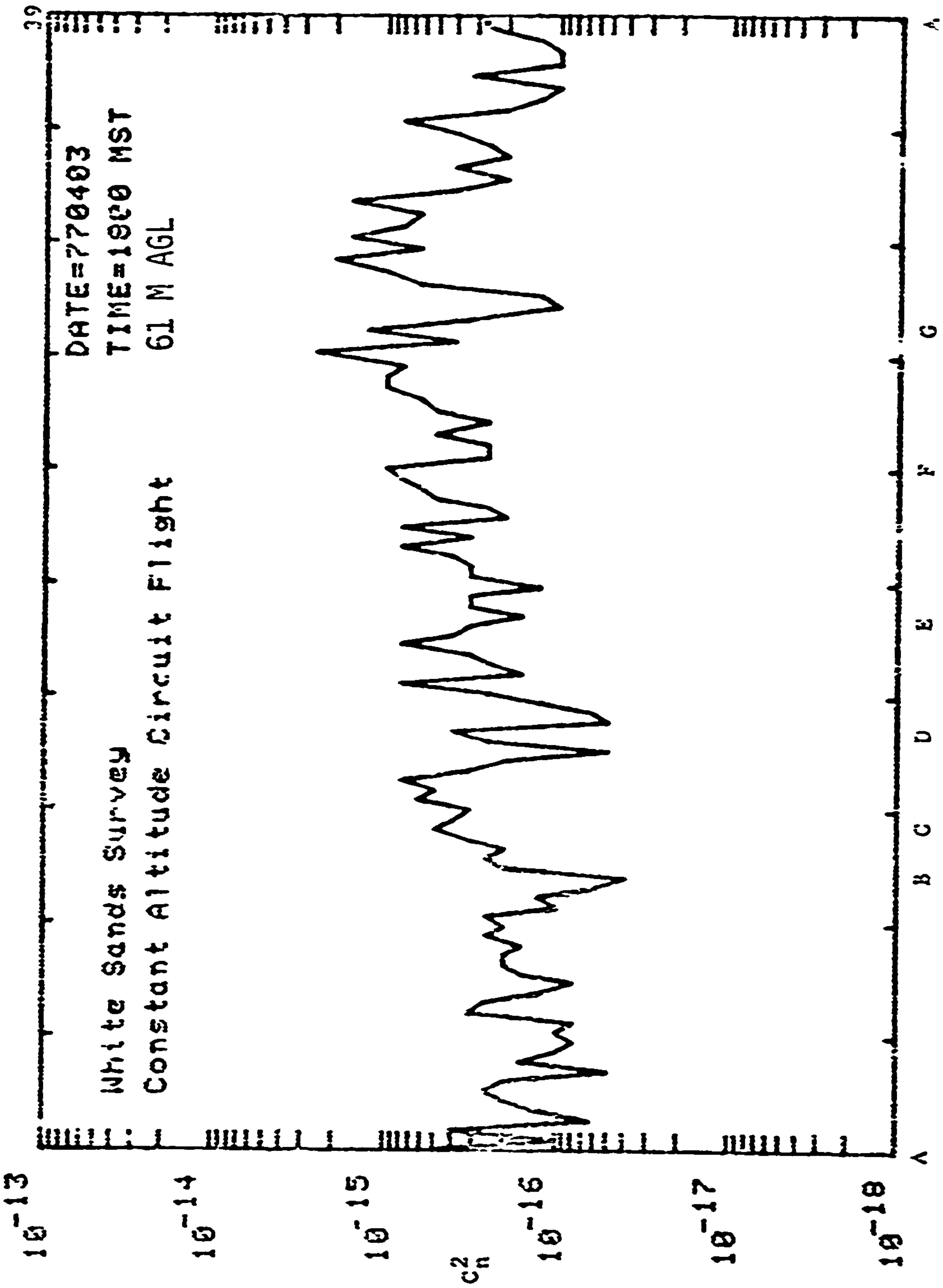
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770403
TIME=1000 MST
61 M AGL
10^{-13}
10^{-14}
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C_n^2
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10^{-18}
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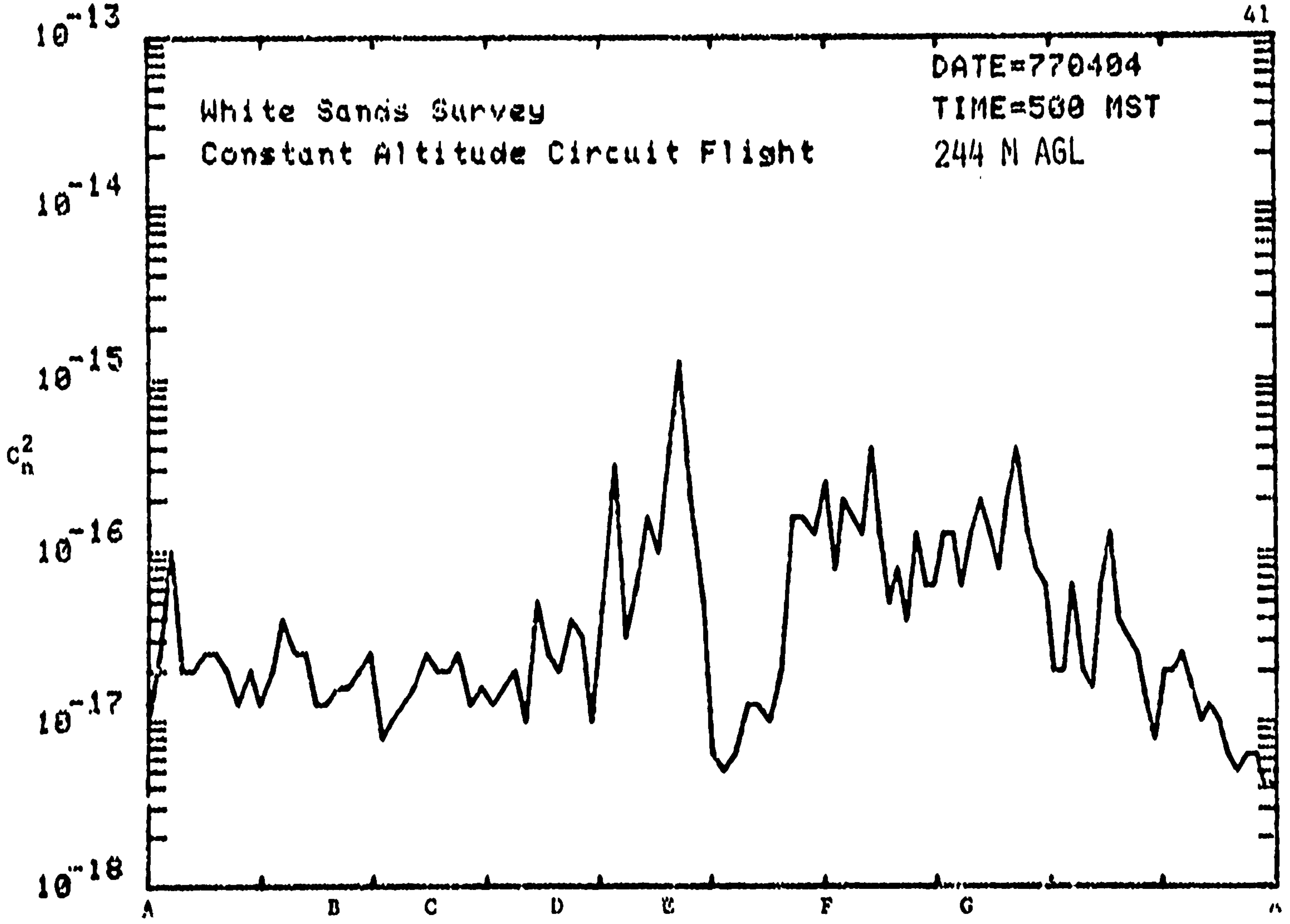
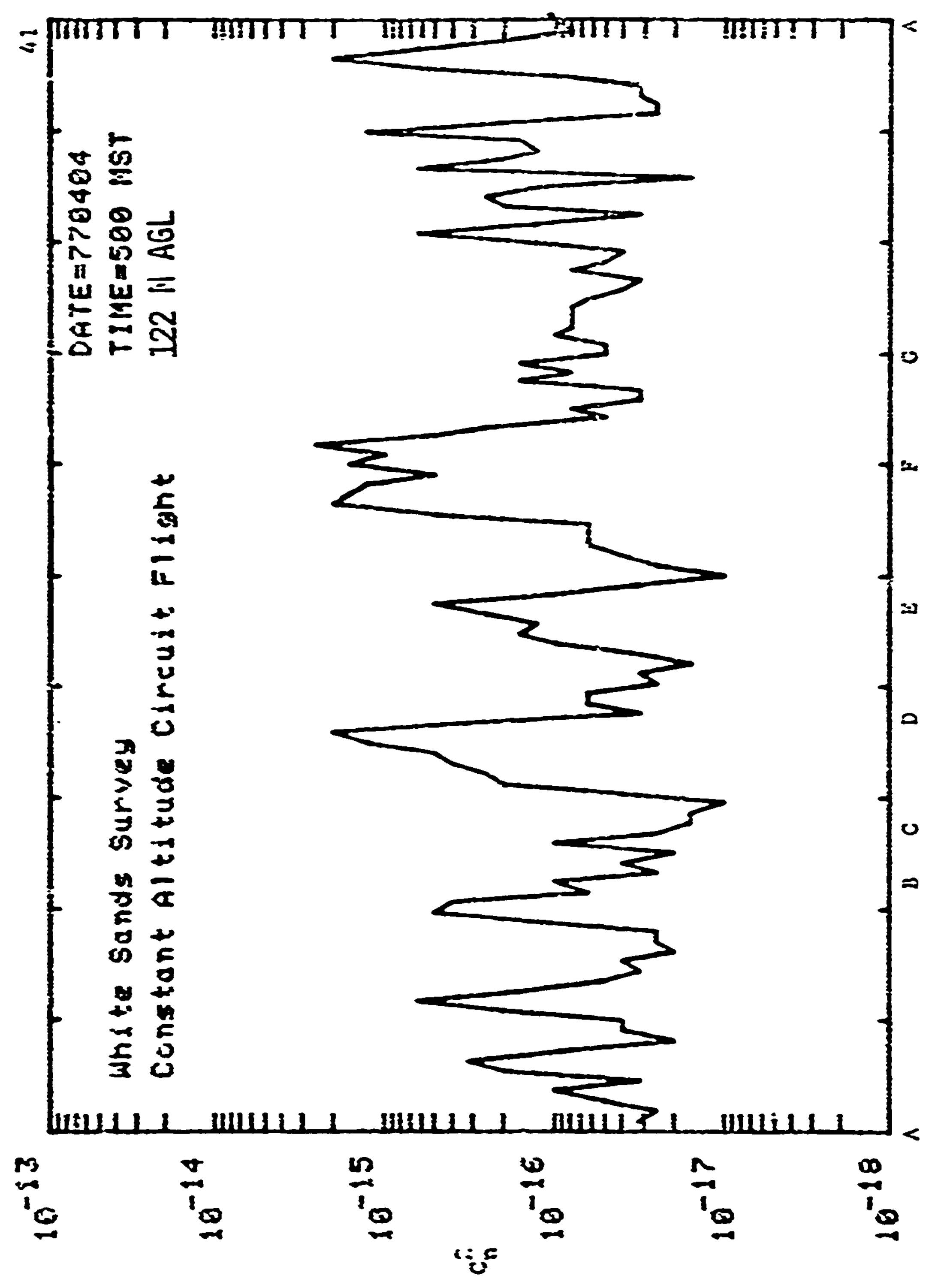
C
D
E
F
G
A
39


41
White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=500 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=500 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
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10^{-18}
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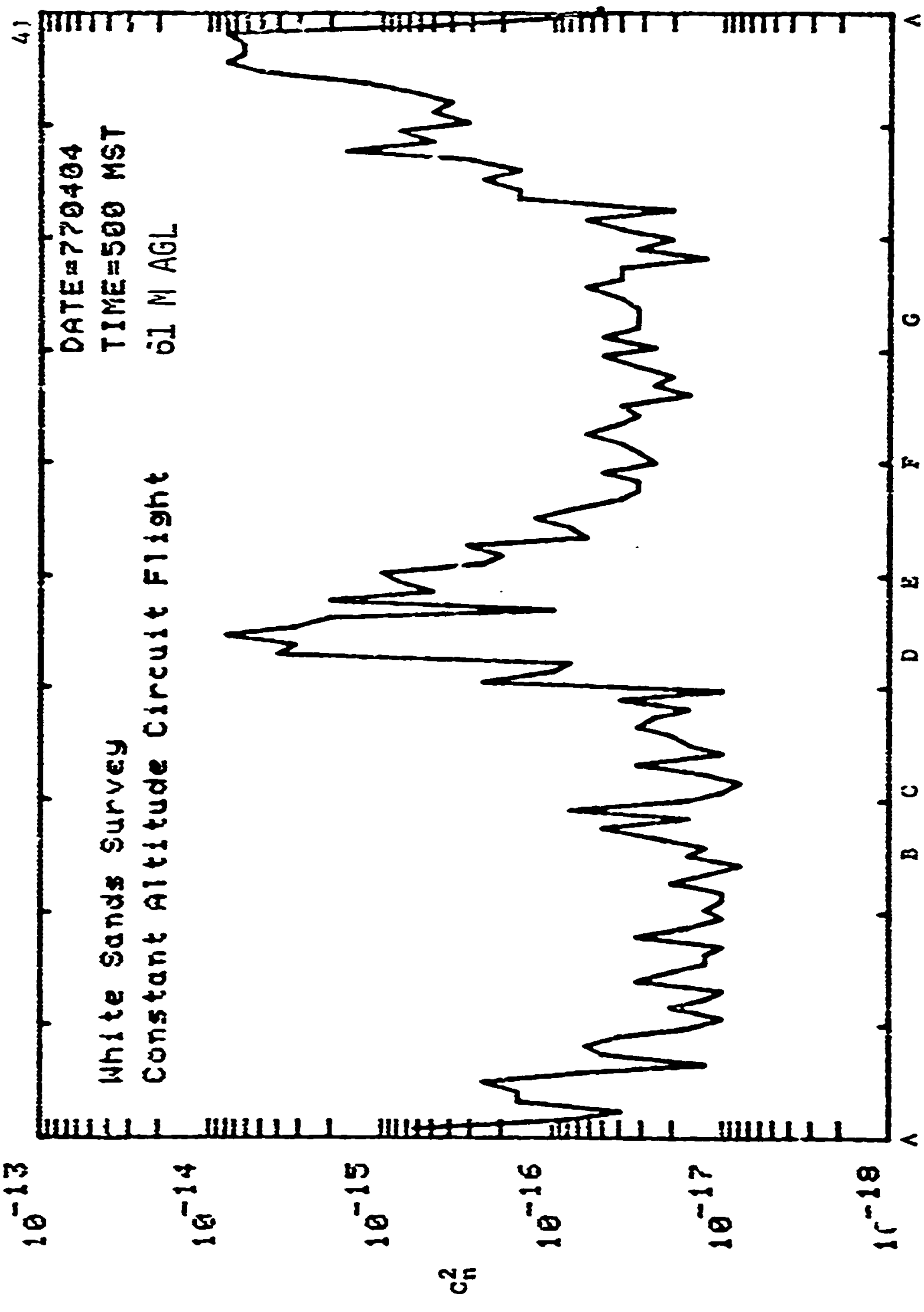
D
E
F
G
A
41


White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=500 MST
61 M AGL
C_n^2
10^{-13}
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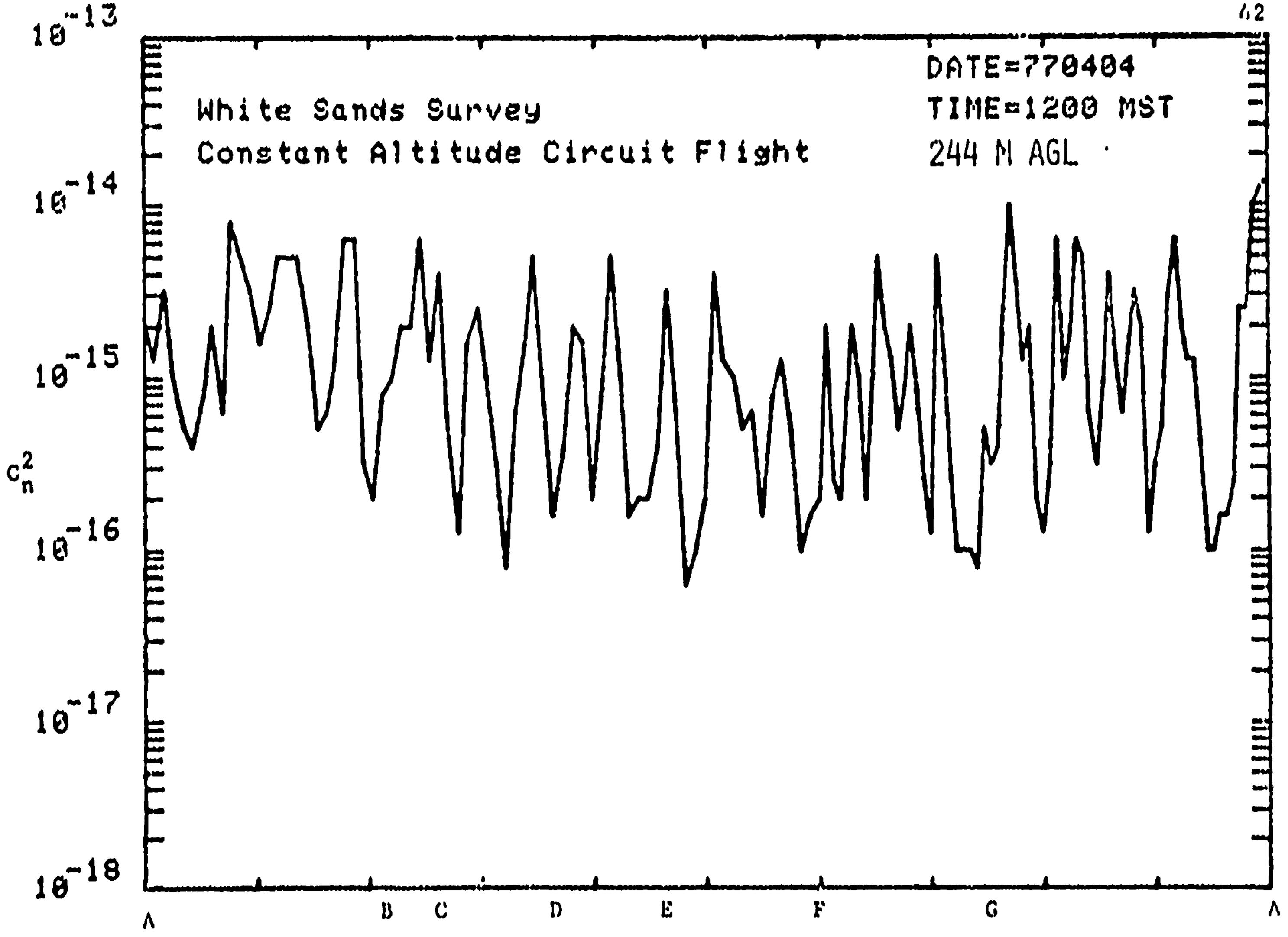
D
E
F
G
A
41


White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=1200 MST
244 M AGL
42
C_n^2
10^{-13}
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10^{-15}
10^{-16}
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10^{-18}
A
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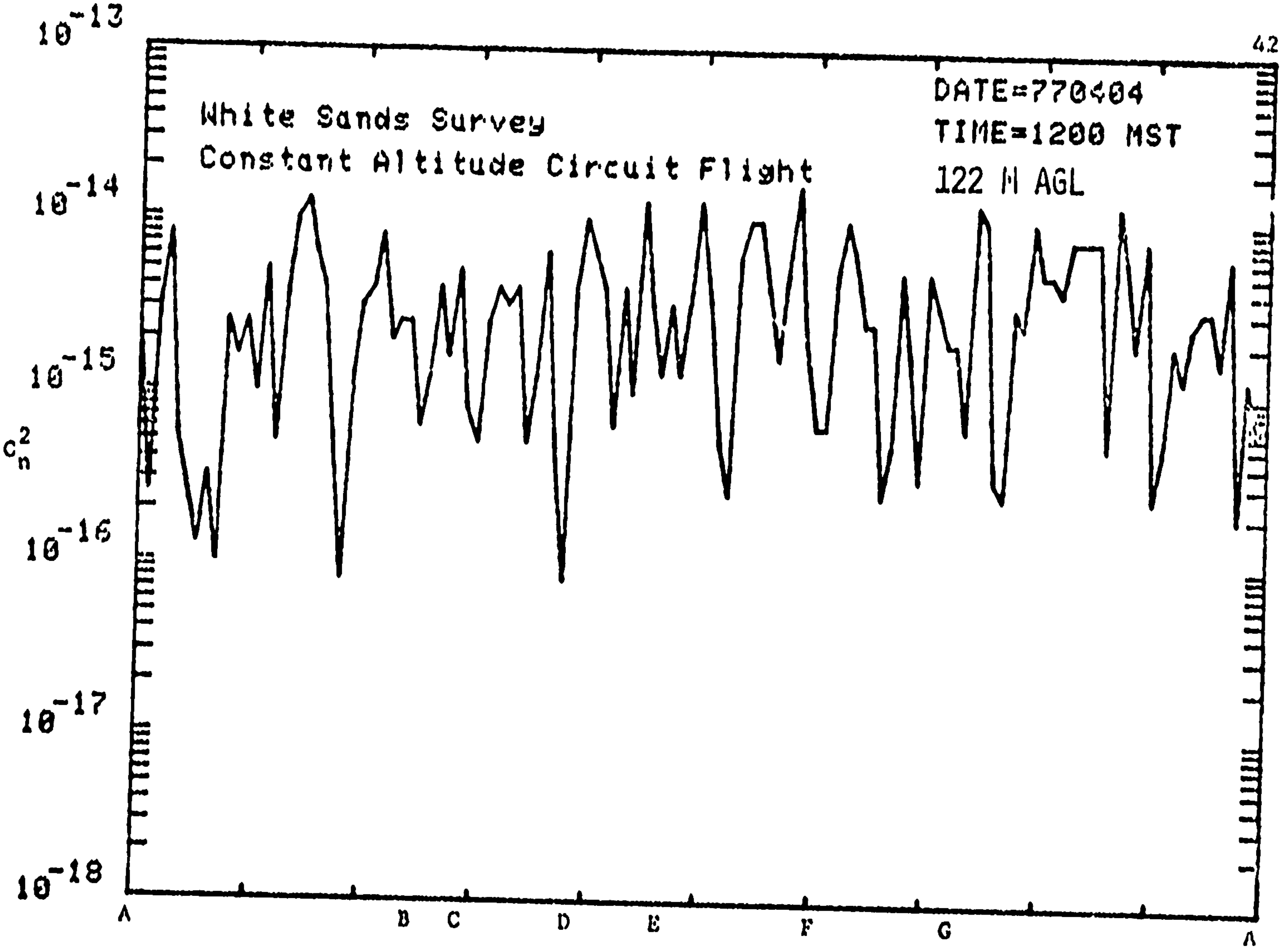
C
D
E
F
G
A


42
White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=1200 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
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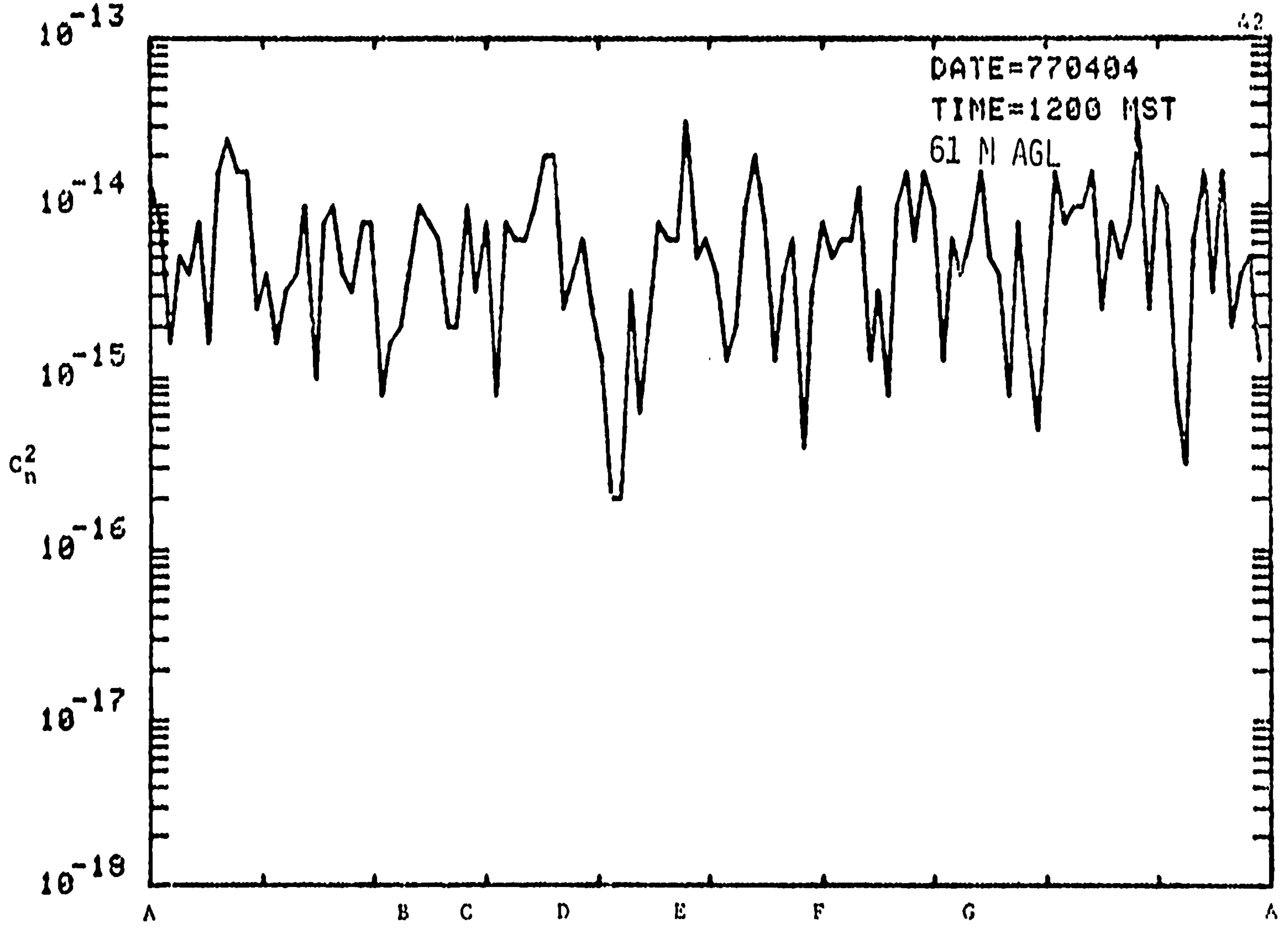
C
D
E
F
G
A


DATE=770404
TIME=1200 MST
61 M AGL
C_n^2
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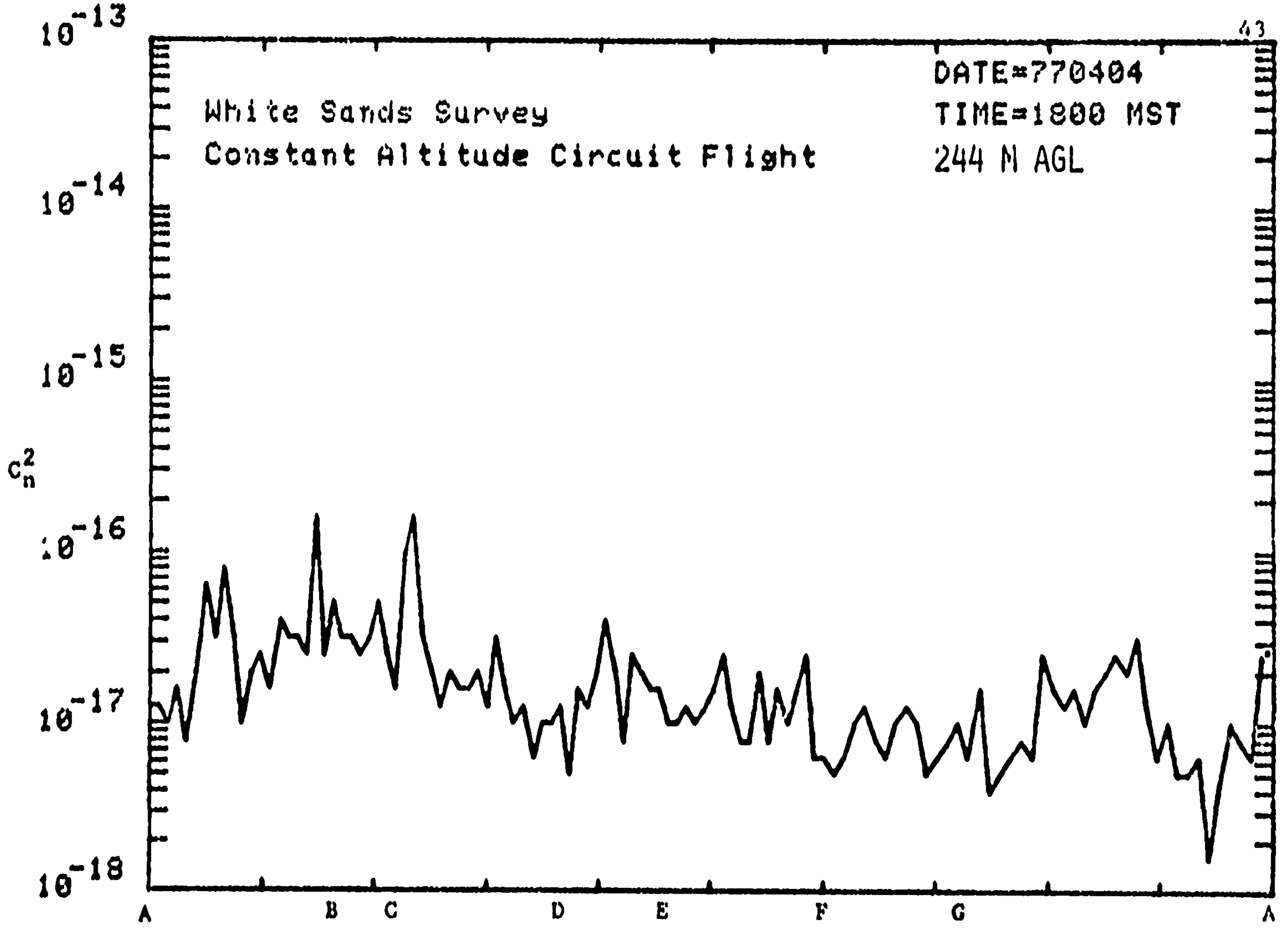
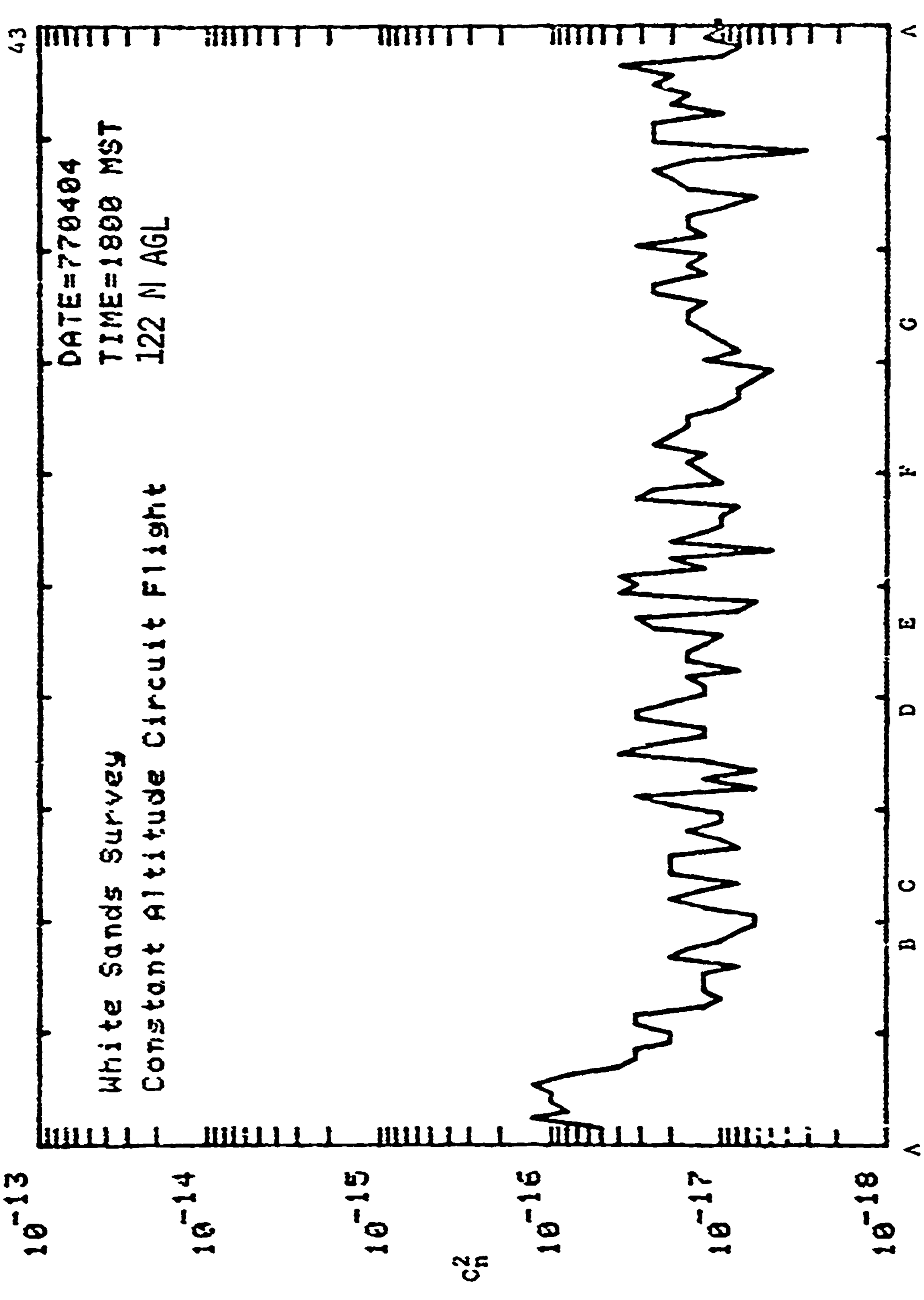
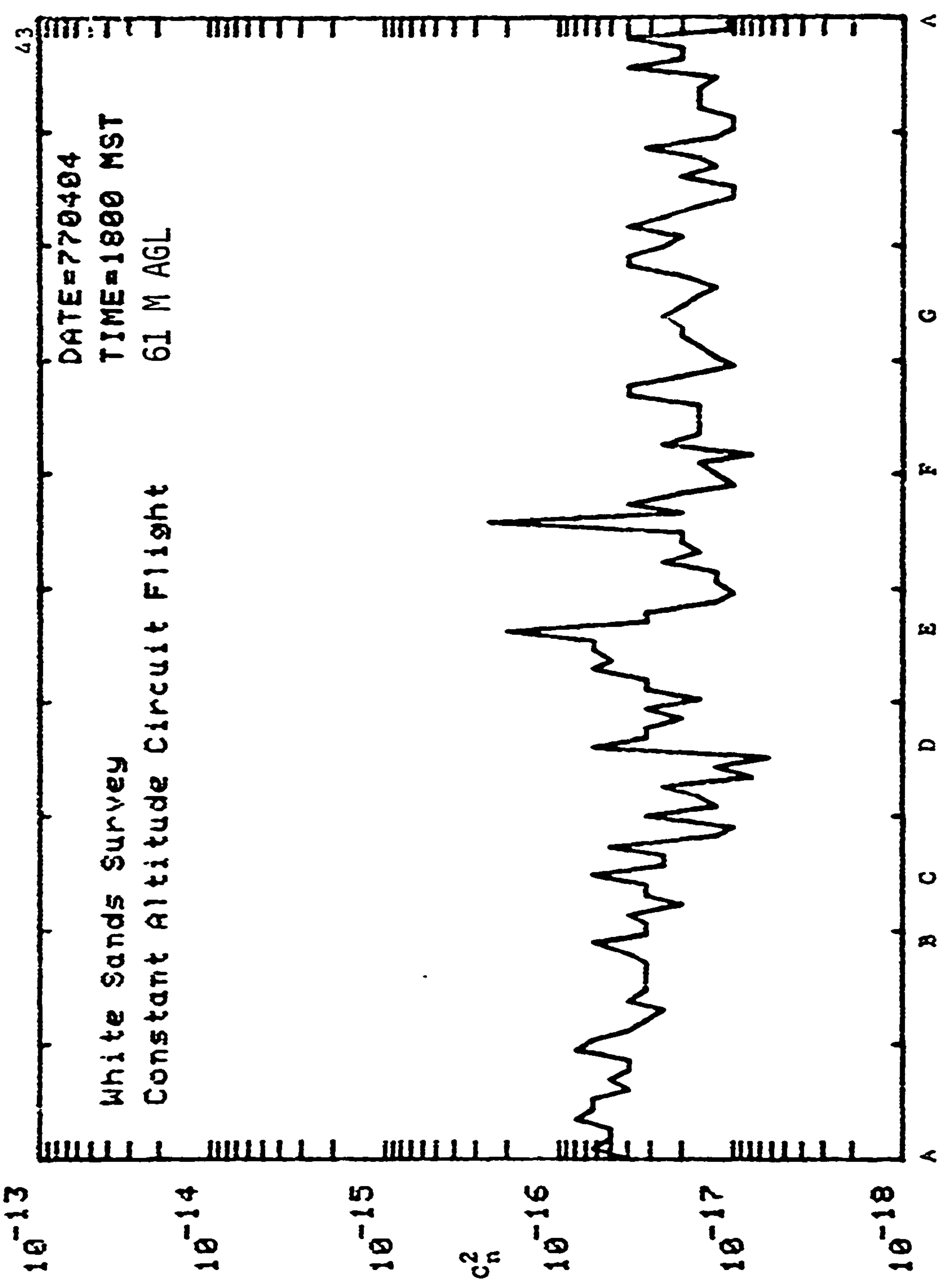
D
E
F
G
A
42


White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=1800 MST
244 M AGL
43
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
A
B
C
D
E
F
G
A


White Sands Survey
Constant Altitude Circuit Flight
DATE=770404
TIME=1800 MST
122 M AGL
C_n^2
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
43
A
B
C
D
E
F
G
A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TIME=1800 MST
61 M AGL
43
10^{-13}
10^{-14}
10^{-15}
C_n^2
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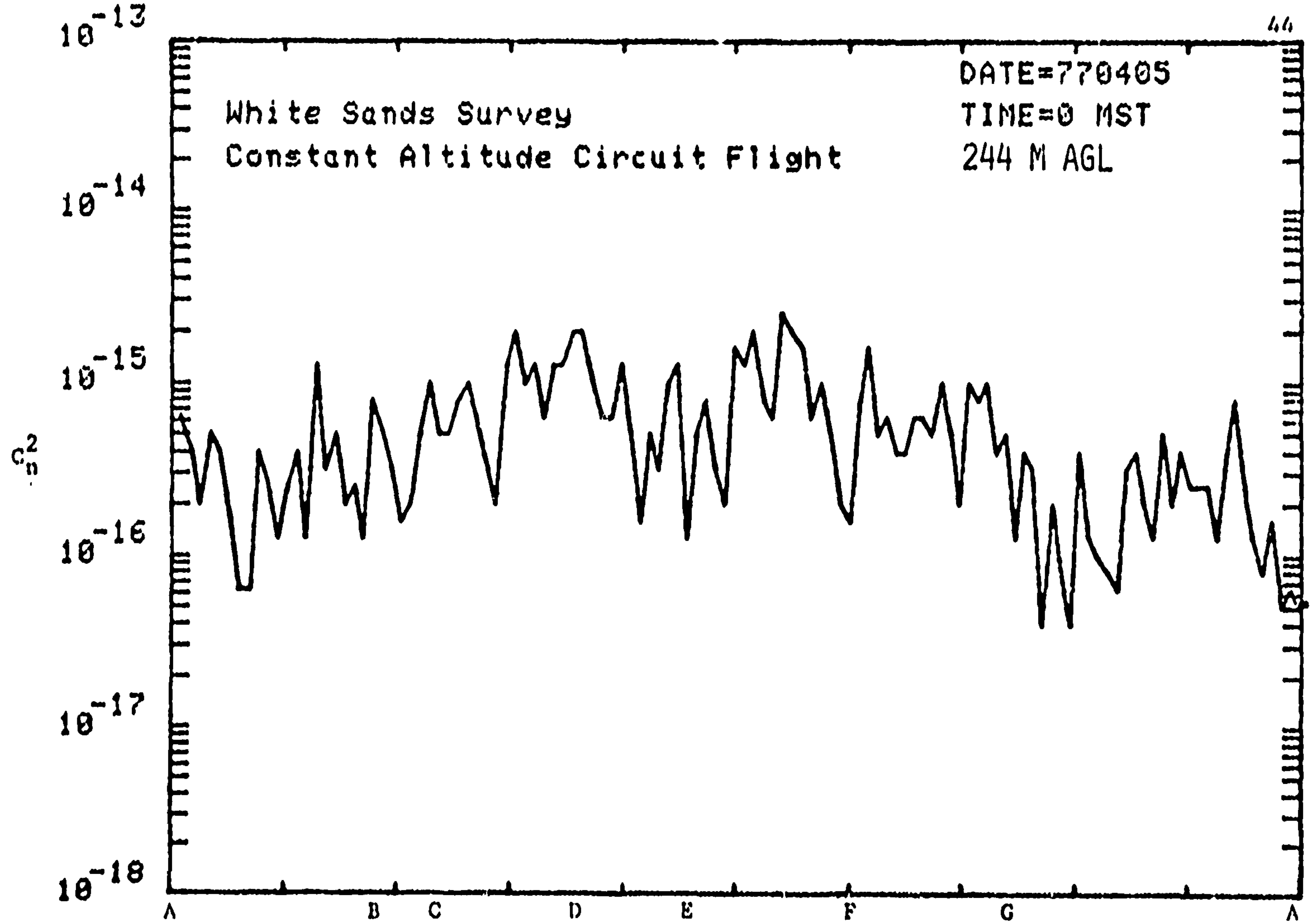
C
D
E
F
G
A


44
White Sands Survey
Constant Altitude Circuit Flight
DATE=770405
TIME=0 MST
244 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
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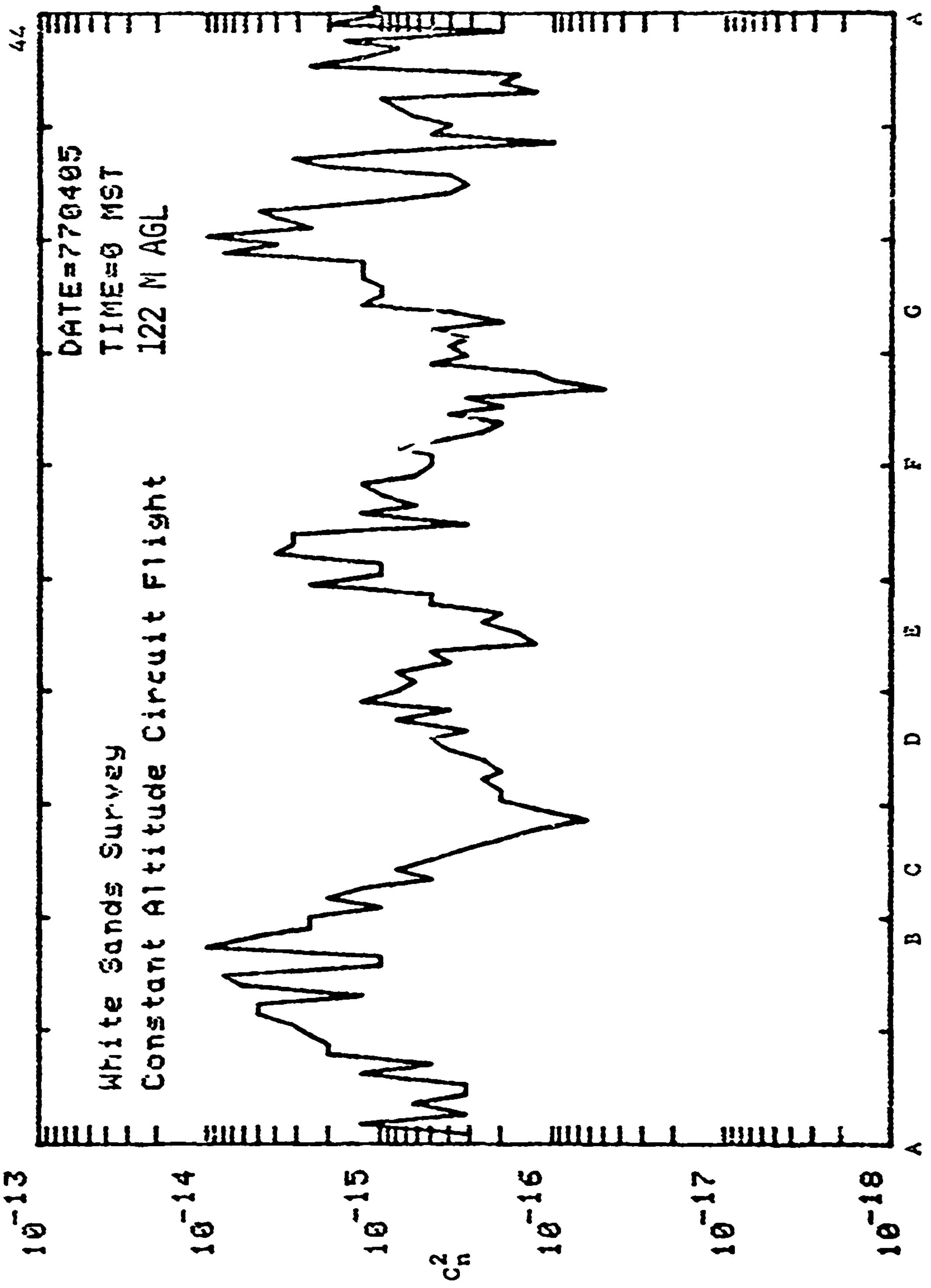
C
D
E
F
G
A


44
White Sands Survey
Constant Altitude Circuit Flight
DATE=770405
TIME=0 MST
122 M AGL
10^{-13}
10^{-14}
10^{-15}
10^{-16}
10^{-17}
10^{-18}
C_n^2
A
B
C
D
E
F
G
A

APPENDIX B

DATA EDITING

With respect to measurements of optical turbulence, two types of editing were employed - objective and subjective. The objective editing was concerned with the effect of the towers on the measurements, continuity problems, and power surges. Data deletion was by statistical analysis through appropriate programming. The subjective editing centered on meteorological phenomena and was edited out of the final plot after a thorough analysis of the objectively edited data.

Tower Effect

Turbulence sensors were mounted at approximately the 9 m and 33 m levels of the towers at the LSTC and Apache Site (Fig. 3). It was felt that the tower would have little effect on the measurements at 33 m, but the measurements at 9 m should be edited for tower shadow effect.

Figure B1 shows the orientation of the wind and turbulence probes at the 9 m level at Apache Site. The direct tower effect angle thus ranges from 90° to 155°. Ten degrees was added to either side of the sector to act as a safety factor against tower boundary effects.* Thus, for each 10-second average of C_T^2, the corresponding 10-second average wind direction was examined. If that wind direction fell between 80° and 165°, the C_T^2 value was eliminated from the data set. As noted in Table 7 there were a maximum of 90 ten-second average data points in a given 15-minute average of C_T^2 which was plotted as C_N^2. If the elimination of the data effected by the tower resulted in less than 30 data points in a given 15-minute period, then the 15-minute average was eliminated from the daily plot.

Probe Problems

Another source of error resided in the probes themselves. For example, a probe may be broken and not making contact, or it may be broken and making sporadic contact. In the former case, the signal will be low and exhibit very little variation. In the latter case, the standard deviation of C_T^2 will be quite large. Both sources of error were corrected through statistical procedures.

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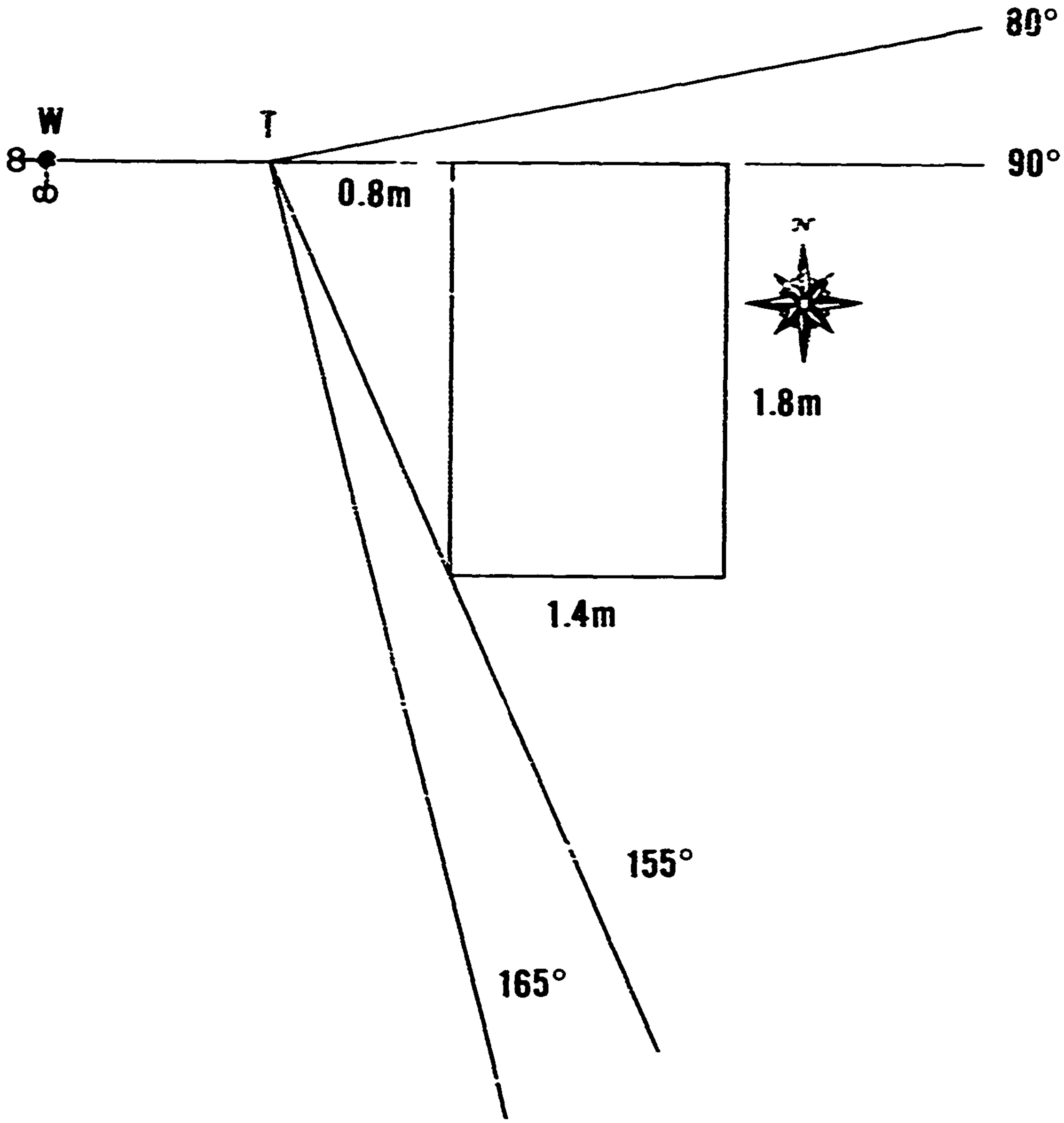
*The same direction criteria were applied to the LSTC data.



APACHE SITE
METEOROLOGICAL TOWER
9m LEVEL

Figure B1. Orientation of the wind (W) and turbulence (T) probes at the 9 m level of the 33 m tower at Apache Site.

Power Surges

A third source of error is that represented by the effect of power surges. Any 10-second average C_T^2 value greater than four standard deviations away from the mean was eliminated from the data set.

Meteorological

The last source of potential error which was treated - meteorological phenomena - was handled subjectively. After the objectively edited data had been tabularized and plotted by day, the data were subjectively analyzed. The question to be resolved was what, if any, meteorological phenomena could cause significant (greater than one decade) short term variations in C_n^2? The analysis hinged on:

(1) Wind direction as f(time)

(2) Standard deviation as f(time)

(3) Lapse rate as f(time)

(4) Temperature as f(time)

If the significant short term changes in the 15-minute averages of C_T^2 were not meteorologically interpretable, then they were deleted from the data set.

The wind data were not edited.

APPENDIX C

TURBULENCE SENSORS AND THEIR CALIBRATION

The turbulence sensors used in this experiment incorporate coiled 8- to 10-micrometer diameter tungsten filaments from Westinghouse and General Electric 3-watt, 120-volt light bulbs as the temperature sensing elements. These sensors operate in a differential configuration with a 20 cm vertical separation. The electronic circuit uses a direct current bridge with 500 microamperes flowing through the probes. The voltage variations across the filaments are amplified about 3000 times by a differential amplifier with a frequency response which is bandwidth limited between 0.016 Hz and 750 Hz at the half power points. The amplified voltage fluctuations feed a root-mean square (RMS) module which has a 10-second averaging period.

At a typical gain setting where a 1°C peak-to-peak temperature fluctuation corresponds to 2 volts peak-to-peak in the RMS module, the sensor package has a C_N^2 dynamic range from the noise level of approximately 4×10^{-17} $m^{-2/3}$ to the onset of electronic clipping at about 4×10^{-12} $m^{-2/3}$.

Tungsten filaments are used instead of fine platinum wires to achieve an acceptable probe lifetime. Under typical weather conditions with no precipitation, a tungsten filament probe life of one week is realized. Under similar conditions the lifetime of a 1-micrometer platinum wire would be measured in hours.

The use of the 8- to 10-micrometer diameter tungsten probes reduces the high frequency response; however, in practice this does not appear to be significant since the spectrum of C_T^2 (C_N^2) encountered in the atmosphere has most of the energy at low frequencies. This is demonstrated in Fig. C1, where two equivalent turbulence sensors with different probes are compared. One device used 1-micrometer diameter platinum probes as a reference standard. The other instrument used the 8- to 10-micrometer diameter 3-watt to 120-volt tungsten filament probes. The systems were operated with a basic vertical probe separation of 20 cm; however, the two instruments were moved so that corresponding probes were within 2 cm of each other.

The system's calibration depends upon the temperature coefficients of resistance for the probes. The temperature coefficient for the tungsten filaments was measured as 0.00423 ± 0.00001 ohm/°C although some lots were 0.00443 ± 0.00001 ohm/°C. The platinum probe temperature coefficient was measured as 0.00385 ± 0.00001 ohm/°C. As can be seen in Fig. C1, the tungsten sensor response was about 5% higher than the fine wire platinum response. This difference was within the experimental error. A dynamic calibration with an oscilloscope was used and this limits the

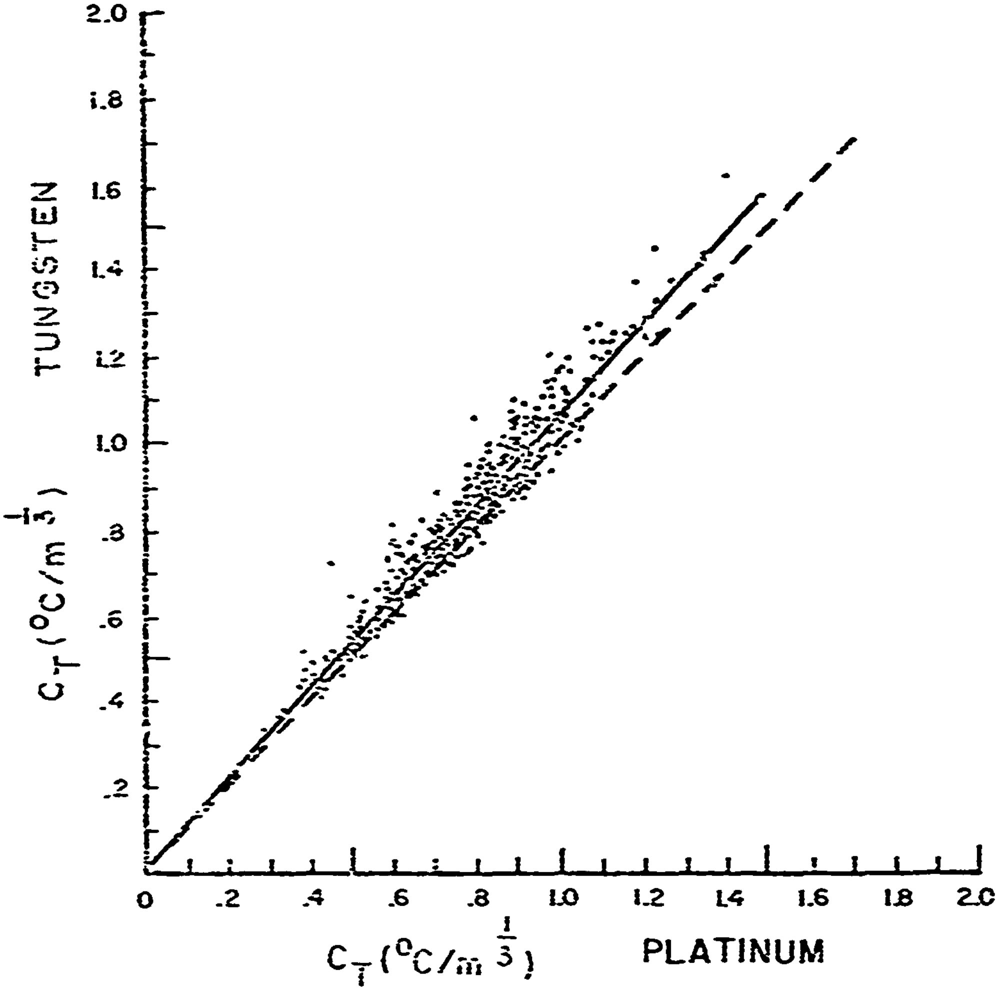


Figure C1. Comparison between turbulence response for two equivalent systems with different probes. The abscisssa represents the response of a 1-micrometer diameter platinum wire probe while the ordinate represents the response of an 8- to 10-micrometer diameter 3-watt to 120-volt tungsten filament probe.

calibration accuracy to 2 to 3% per system. For the 20 cm separation used for these sensors, the tungsten filament measurement accuracy does not differ significantly from the results with the 1-micrometer platinum probes. The absolute accuracy of the turbulence sensor can be estimated from this comparison as ±5% for C_T (C_N) or ±10% for C_T^2 (C_N^2).

APPENDIX D

ADDITIONAL PARTICULATE INFORMATION
16-19, 23 March 1977

Prior to the 24 March to 8 April 1977 sampling period, particulate size distribution, windspeed, and relative humidity measurements were made at the Arky Site. The resultant graphical depictions of extinction coefficient, windspeed, and relative humidity are shown in Figs. D1 through D10.

Tabular listings of the size distribution, extinction coefficient at $\lambda = 1.06$, $\lambda = 3.8$, and $\lambda = 10.6$ and mass loadings are covered in Table D1.

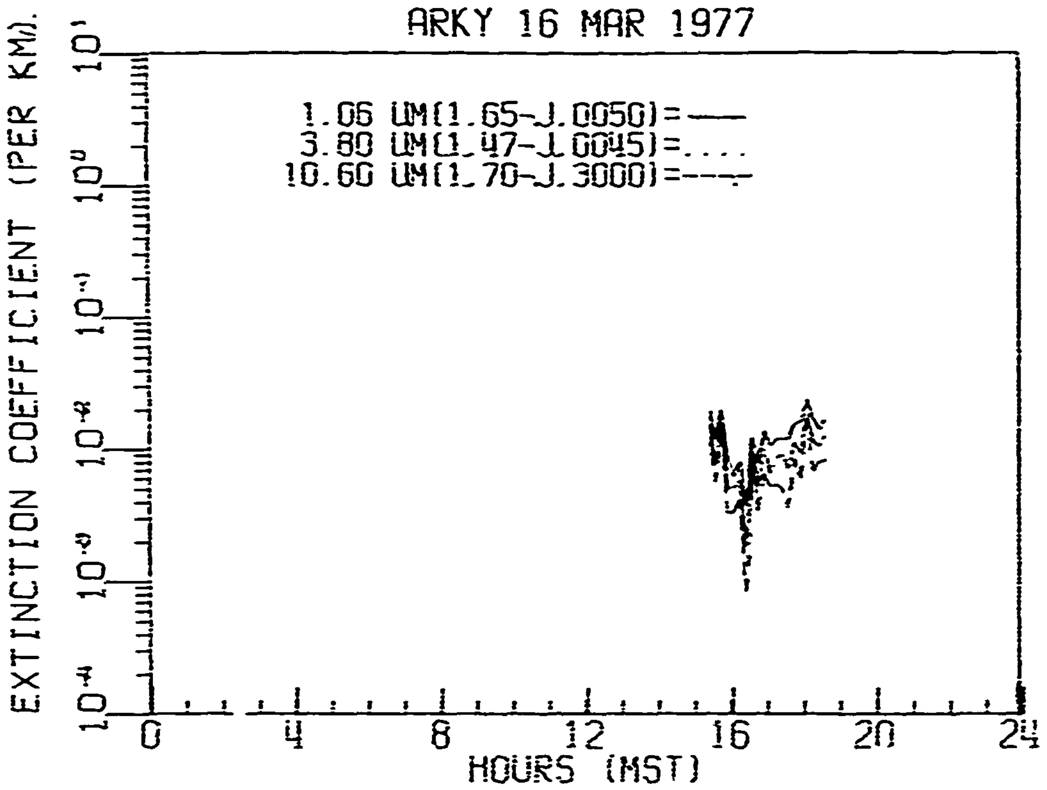


Figure D1. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 16 March 1977.

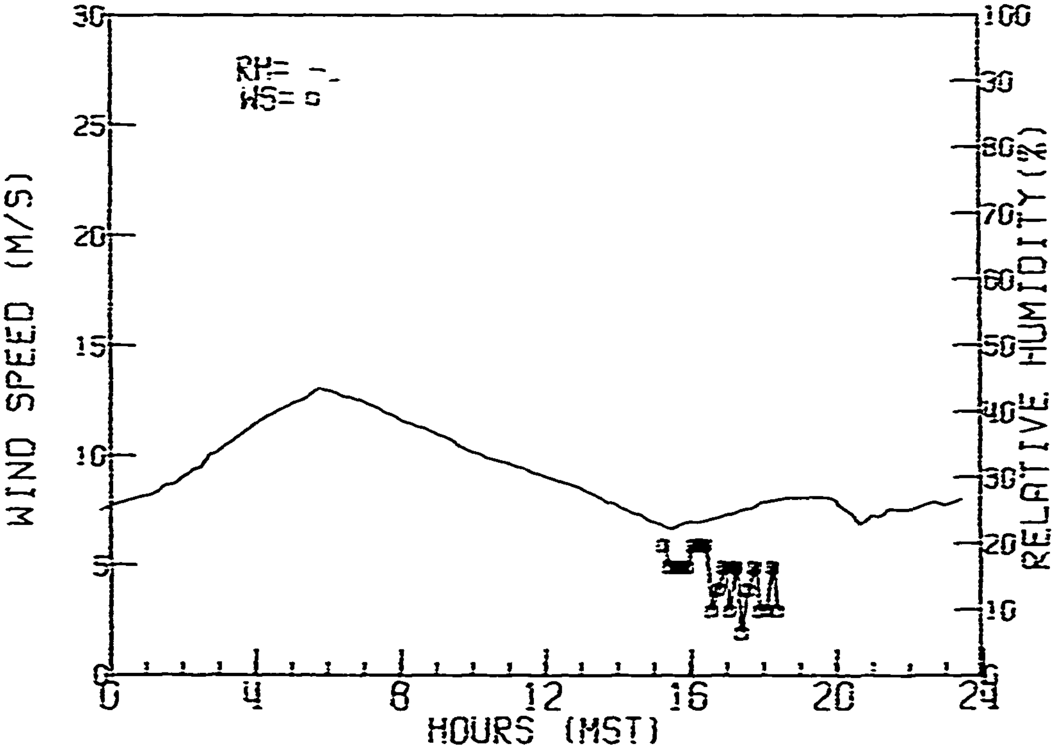


Figure D2. Diurnal variation of windspeed and relative humidity, Arky site, 16 March 1977.

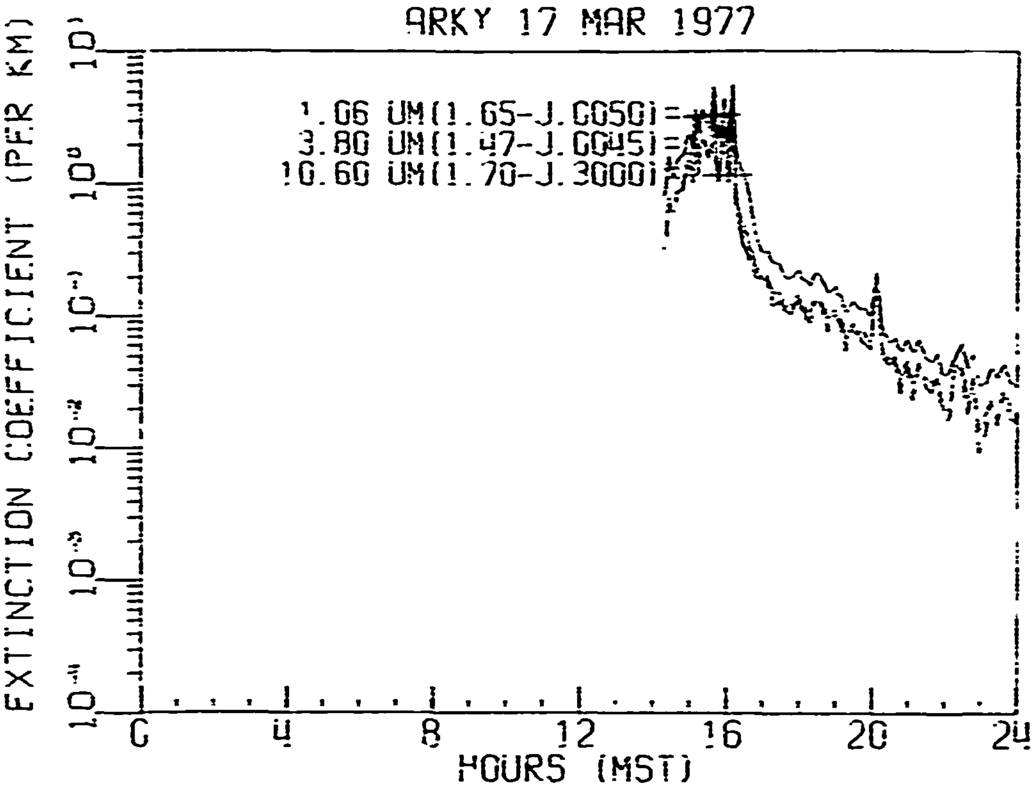


Figure D3. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 17 March 1977.

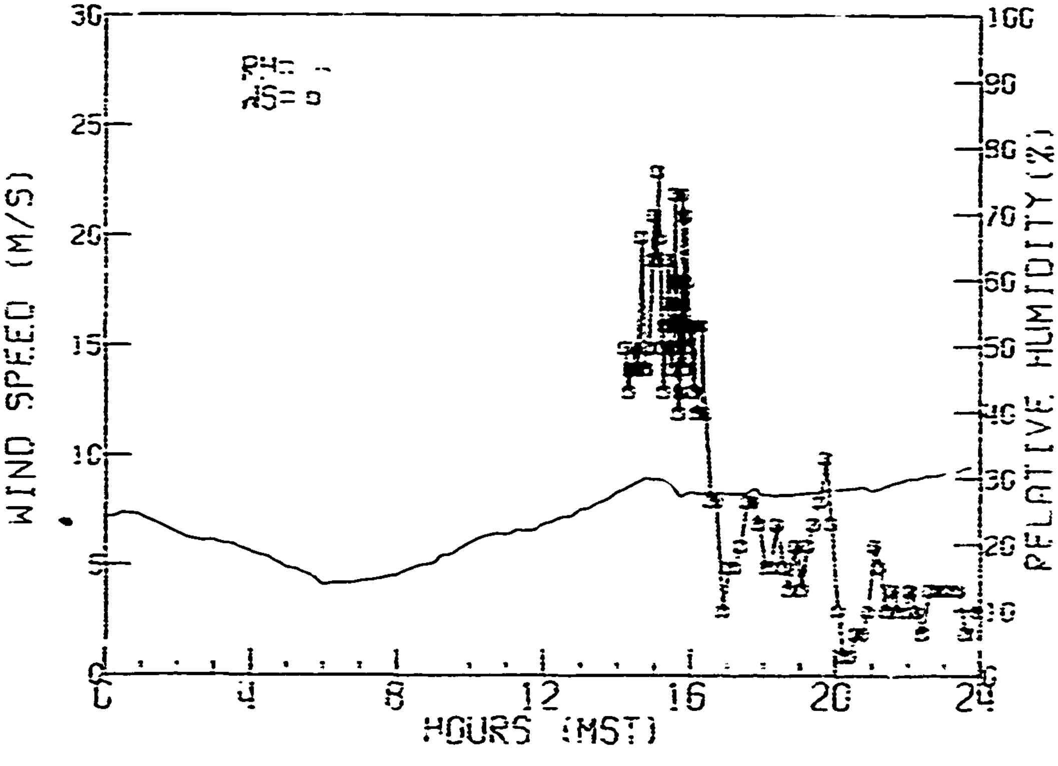


Figure D4. Diurnal variation of windspeed and relative humidity, Arky Site, 17 March 1977.

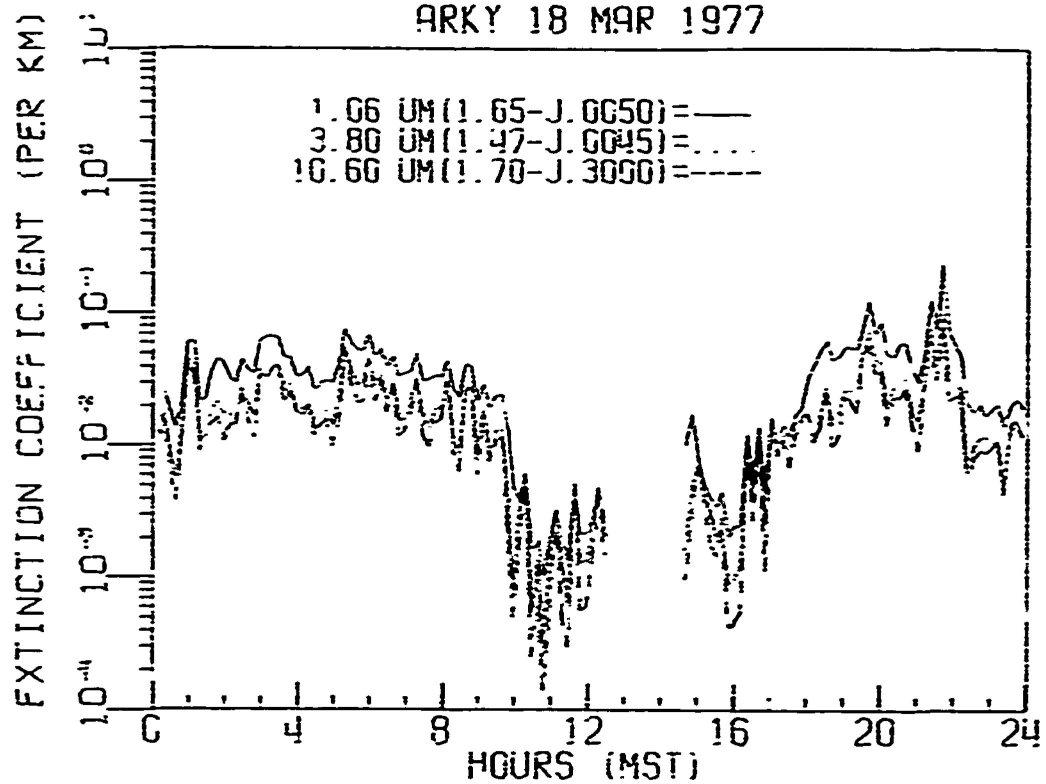


Figure D5. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 18 March 1977.

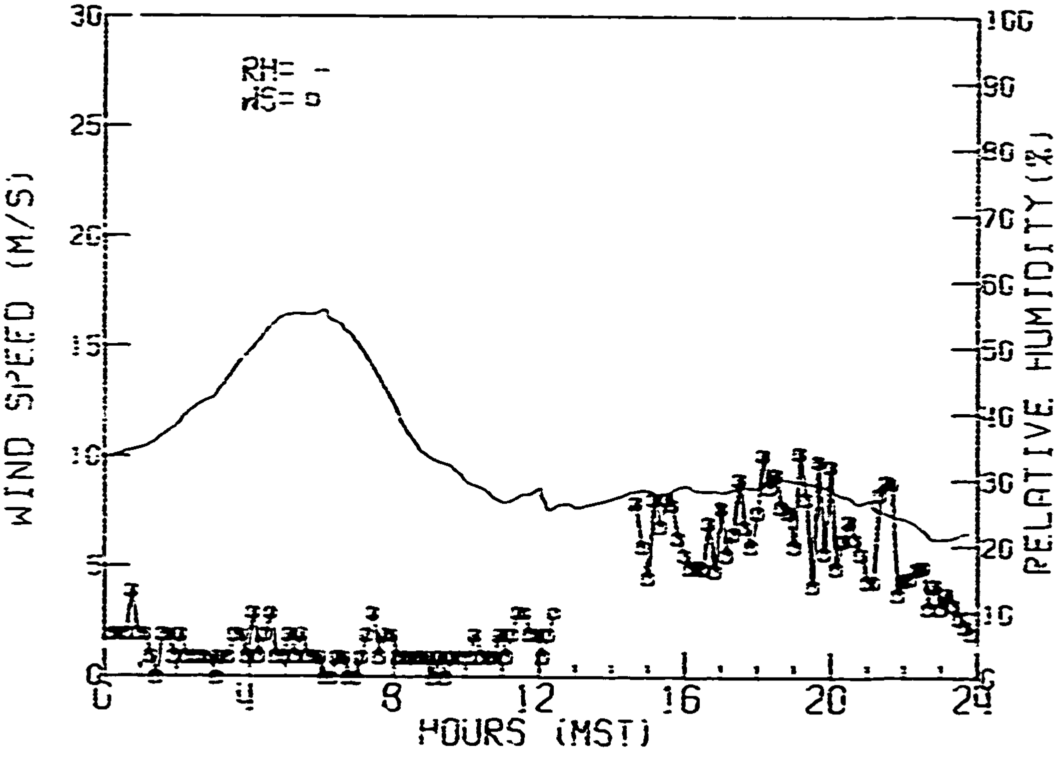


Figure D6. Diurnal variation of windspeed and relative humidity, Arky Site, 18 March 1977.

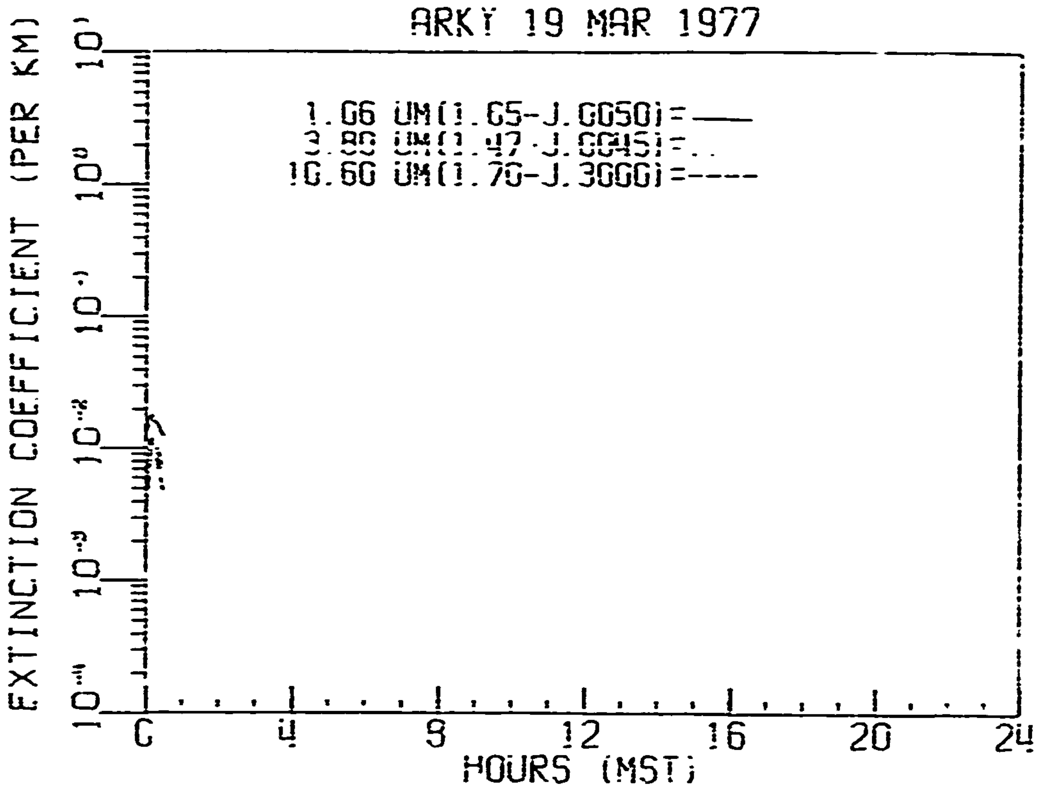


Figure D7. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 19 March 1977.

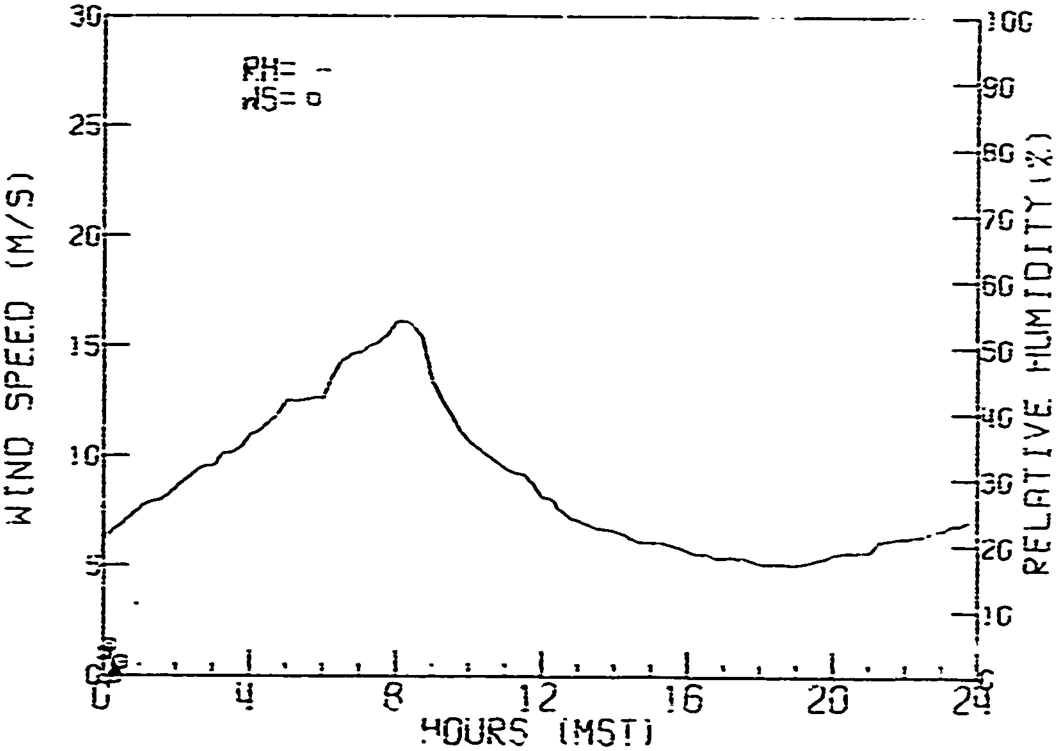


Figure D8. Diurnal variation of windspeed and relative humidity, Arky Site, 19 March 1977.

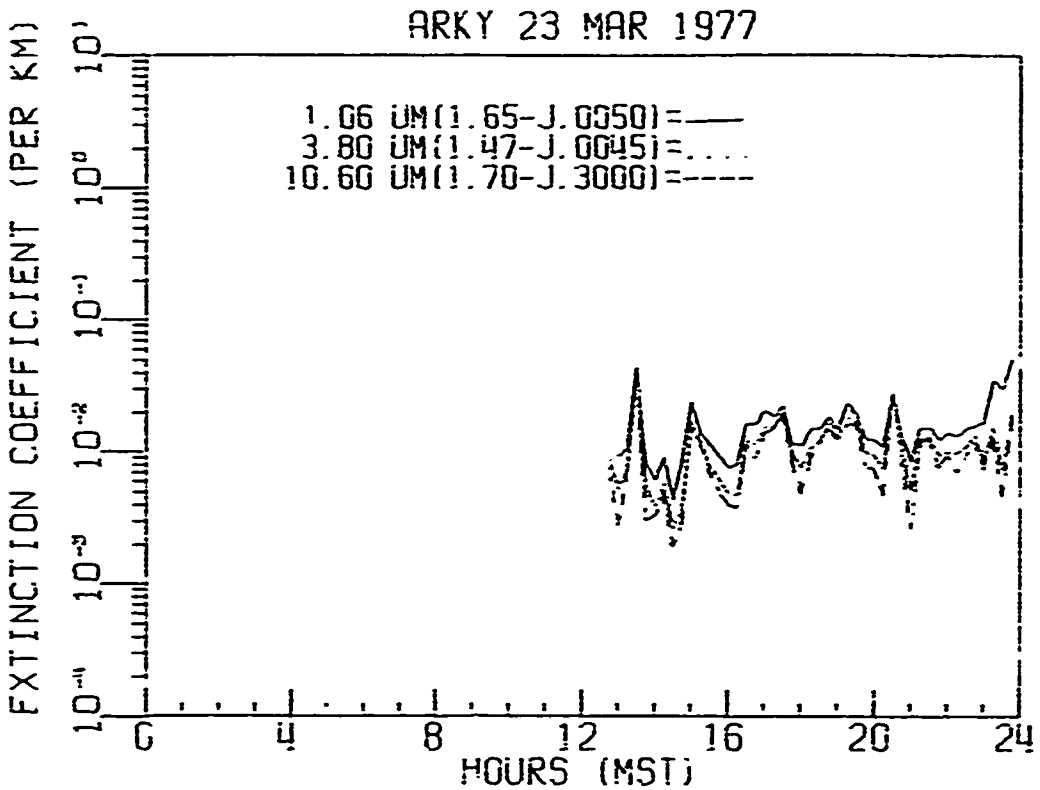


Figure D9. Diurnal variation of the particulate extinction coefficient for λ=1.06 μm, λ=3.8 μm and λ=10.6 μm for Arky Site, 23 March 1977.

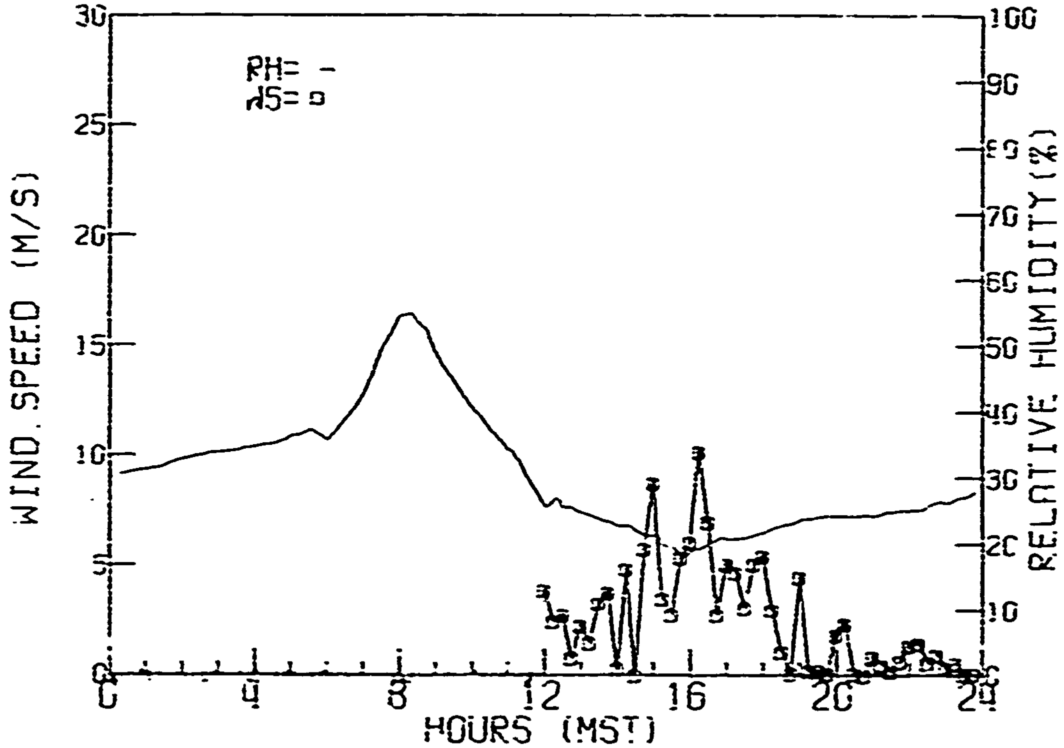


Figure D10. Diurnal variation of windspeed and relative humidity, Arky Site, 23 March 1977.

TABLE D1
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
			1	2	3	4	5	6	7	8	1.06	3.8	10.6	
16 MAR 77														
	15:31:00	600	.11+01	.90+00	.37+00	.15-01	.48-01	.20-01	.00	.00	.19-01	.15-01	.12-01	135.
	15:41:00	600	.12+01	.47+00	.24+00	.15-01	.48-01	.00	.00	.00	.12-01	.76-02	.58-02	37.
	15:51:00	600	.13+01	.84+00	.33+00	.30-01	.48-01	.20-01	.00	.00	.20-01	.16-01	.13-01	134.
	16:01:00	600	.87+00	.51+00	.61-01	.30-01	.00	.00	.00	.00	.85-02	.52-02	.34-02	31.
	16:11:00	600	.49+00	.26+00	.15+00	.30-01	.00	.00	.00	.00	.63-02	.52-02	.33-02	27.
	16:21:00	600	.73+00	.41+00	.61-01	.46-01	.00	.00	.00	.00	.82-02	.59-02	.42-02	37.
	16:31:00	600	.50+00	.19+00	.91-01	.00	.00	.00	.00	.00	.38-02	.19-02	.87-03	8.
	16:41:00	600	.79+00	.56+00	.12+00	.15-01	.00	.20-01	.00	.00	.12-01	.94-02	.79-02	104.
	16:51:00	600	.90+00	.20+00	.15+00	.30-01	.00	.00	.00	.00	.80-02	.54-02	.35-02	30.
	17:01:00	600	.14+01	.50+00	.24+00	.61-01	.00	.00	.00	.00	.14-01	.10-01	.66-02	56.
	1 :11:00	600	.11+01	.45+00	.15+00	.15-01	.48-01	.00	.00	.00	.11-01	.65-02	.53-02	34.
	17:21:00	600	.10+01	.67+00	.21+00	.46-01	.00	.00	.00	.00	.12-01	.87-02	.54-02	46.
	17:31:00	600	.10+01	.58+00	.40+00	.30-01	.00	.00	.00	.00	.12-01	.92-02	.51-02	40.
	17:41:00	600	.14+01	.64+00	.27+00	.15-01	.00	.00	.00	.00	.12-01	.71-02	.37-02	32.
	17:51:00	600	.13+01	.67+00	.30+00	.46-01	.48-01	.00	.00	.00	.16-01	.11-01	.85-02	59.
	18:01:00	600	.18+01	.88+00	.37+00	.00	.48-01	.00	.00	.00	.17-01	.95-02	.61-02	41.
	18:11:00	600	.14+01	.88+00	.27+00	.15-01	.48-01	.39-01	.00	.00	.24-01	.19-01	.17-01	206.
	18:21:00	600	.15+01	.94+00	.40+00	.46-01	.00	.00	.00	.00	.17-01	.12-01	.68-02	57.
	18:31:00	600	.12+01	.60+00	.24+00	.46-01	.48-01	.00	.00	.00	.14-01	.10-01	.80-02	56.
	18:41:00	600	.12+01	.77+00	.44+00	.30-01	.48-01	.00	.00	.00	.17-01	.13-01	.84-02	55.
17 MAR 77														
	14:16:57	600	.10+03	.12+02	.44+01	.64+00	.96+00	.51+00	.00	.00	.69+00	.33+00	.30+00	3573.
	14:22:33	336	.18+03	.20+02	.71+01	.12+01	.21+01	.60+00	.00	.00	.12+01	.53+00	.47+00	5152.
	14:26:43	280	.25+03	.30+02	.10+02	.19+01	.31+01	.11+01	.00	.00	.17+01	.82+00	.75+00	8346.
	14:33:28	405	.15+03	.18+02	.67+01	.15+01	.25+01	.90+00	.00	.00	.11+01	.61+00	.58+00	6381.
	14:38:45	317	.19+03	.33+02	.12+02	.24+01	.19+01	.13+01	.00	.00	.15+01	.88+00	.77+00	8963.
	14:43:50	305	.20+03	.33+02	.13+02	.22+01	.47+01	.14+01	.00	.00	.16+01	.98+00	.92+00	9663.
	14:48:37	287	.20+03	.40+02	.16+02	.26+01	.43+01	.11+01	.00	.00	.17+01	.10+01	.89+00	9018.
	14:53:05	260	.22+03	.41+02	.15+02	.30+01	.60+01	.16+01	.00	.00	.19+01	.12+01	.11+01	11644.
	14:56:48	223	.26+03	.59+02	.23+02	.37+01	.43+01	.23+01	.00	.00	.24+01	.15+01	.14+01	15381.
	15:00:46	238	.24+03	.58+02	.22+02	.42+01	.74+01	.18+01	.00	.00	.23+01	.15+01	.14+01	13856.
	15:04:52	246	.24+03	.47+02	.16+02	.25+01	.46+01	.14+01	.00	.00	.19+01	.11+01	.10+01	10706.
	15:07:30	158	.35+03	.10+03	.34+02	.72+01	.11+02	.31+01	.00	.00	.37+01	.25+01	.23+01	23388.
	15:10:31	181	.30+03	.80+02	.31+02	.61+01	.11+02	.33+01	.00	.00	.33+01	.23+01	.22+01	22459.
	15:13:47	196	.29+03	.67+02	.24+02	.47+01	.44+01	.13+01	.00	.00	.24+01	.14+01	.12+01	12241.
	15:16:45	178	.32+03	.71+02	.30+02	.55+01	.79+01	.25+01	.00	.00	.30+01	.20+01	.18+01	18624.
	15 19:19	154	.35+03	.11+03	.44+02	.79+01	.10+02	.25+01	.00	.00	.37+01	.26+01	.22+01	21487.
	15:22:08	169	.33+03	.90+02	.36+02	.63+01	.63+01	.31+01	.00	.00	.33+01	.23+01	.20+01	21701.
	15:24:50	162	.34+03	.90+02	.34+02	.65+01	.12+02	.25+01	.00	.00	.35+01	.23+01	.22+01	20321.
	15:27:56	186	.31+03	.63+02	.25+02	.47+01	.67+01	.23+01	.00	.00	.28+01	.18+01	.16+01	16949.
	15:31:08	192	.30+03	.60+02	.23+02	.44+01	.50+01	.31+01	.00	.00	.28+01	.18+01	.17+01	19286.
	15:34:01	173	.33+03	.75+02	.20+02	.51+01	.78+01	.27+01	.00	.00	.31+01	.20+01	.18+01	19262.

TABLE D1 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
17 MAR 77														
	15:35:16	135	.43+03	.12+03	.44+02	.80+01	.14+02	.31+01	.00	.00	.44+01	.31+01	.28+01	28097.
	15:38:11	115	.47+03	.15+03	.59+02	.12+02	.18+02	.49+01	.00	.00	.56+01	.41+01	.37+01	36751.
	15:40:27	136	.43+03	.12+03	.52+02	.91+01	.12+02	.55+01	.00	.00	.48+01	.35+01	.33+01	35459.
	15:43:48	201	.30+03	.47+02	.17+02	.38+01	.53+01	.19+01	.00	.00	.24+01	.14+01	.13+01	14014.
	15:47:00	192	.32+03	.42+02	.16+02	.28+01	.39+01	.15+01	.00	.00	.22+01	.12+01	.10+01	11840.
	15:49:44	164	.37+03	.55+02	.18+02	.42+01	.53+01	.19+01	.00	.00	.27+01	.15+01	.14+01	14845.
	15:52:15	151	.39+03	.76+02	.26+02	.46+01	.75+01	.33+01	.00	.00	.33+01	.23+01	.19+01	23312.
	15:54:27	132	.42+03	.11+03	.45+02	.88+01	.11+02	.40+01	.00	.00	.44+01	.31+01	.28+01	29767.
	15:55:36	129	.42+03	.13+03	.52+02	.72+01	.12+02	.37+01	.00	.00	.45+01	.30+01	.27+01	27021.
	15:59:04	148	.39+03	.91+02	.31+02	.57+01	.74+01	.37+01	.00	.00	.37+01	.24+01	.21+01	24026.
	16:02:29	235	.33+03	.35+02	.15+02	.24+01	.49+01	.13+01	.00	.00	.21+01	.11+01	.95+00	10472.
	16:05:40	191	.31+03	.47+02	.17+02	.29+01	.57+01	.17+01	.00	.00	.24+01	.13+01	.12+01	12841.
	16:07:31	111	.49+03	.16+03	.55+02	.95+01	.14+02	.45+01	.00	.00	.53+01	.35+01	.32+01	33125.
	16:09:11	100	.50+03	.19+03	.66+02	.11+02	.13+02	.51+01	.00	.00	.58+01	.41+01	.35+01	36663.
	16:11:19	128	.43+03	.13+03	.42+02	.85+01	.97+01	.21+01	.00	.00	.43+01	.25+01	.22+01	20771.
	16:14:45	206	.29+03	.45+02	.17+02	.23+01	.32+01	.10+01	.00	.00	.20+01	.10+01	.84+00	9056.
	16:17:38	263	.24+03	.20+02	.94+01	.16+01	.15+01	.57+00	.00	.00	.14+01	.53+00	.52+00	6092.
	16:23:59	291	.21+03	.25+02	.94+01	.11+01	.18+01	.57+00	.00	.00	.13+01	.56+00	.46+00	5225.
	16:24:55	296	.21+03	.25+02	.76+01	.12+01	.15+01	.23+00	.00	.00	.12+01	.47+00	.36+00	3733.
	16:37:01	486	.13+03	.18+02	.68+01	.82+00	.12+01	.29+00	.00	.00	.80+00	.36+00	.29+00	3303.
	16:47:00	599	.54+02	.11+02	.46+01	.79+00	.55+00	.21+00	.00	.00	.44+00	.25+00	.21+00	2289.
	16:57:00	600	.33+02	.75+01	.30+01	.49+00	.13+01	.22+00	.00	.00	.32+00	.20+00	.19+00	1778.
	17:07:00	600	.32+02	.67+01	.25+01	.64+00	.82+00	.33+00	.00	.00	.31+00	.21+00	.20+00	2076.
	17:17:00	600	.34+02	.60+01	.33+01	.58+00	.38+00	.12+00	.00	.00	.27+00	.16+00	.13+00	1259.
	17:27:00	600	.29+02	.59+01	.27+01	.44+00	.49+00	.11+00	.00	.00	.25+00	.15+00	.15+00	1392.
	17:37:00	600	.23+02	.44+01	.18+01	.20+00	.67+00	.16+00	.00	.00	.20+00	.12+00	.11+00	1131.
	17:47:00	600	.24+02	.43+01	.26+01	.39+00	.43+00	.12+00	.00	.00	.23+00	.12+00	.11+00	1049.
	17:57:00	600	.25+02	.44+01	.22+01	.50+00	.38+00	.22+00	.00	.00	.23+00	.15+00	.14+00	1506.
	18:07:00	600	.22+02	.44+01	.21+01	.33+00	.49+00	.11+00	.00	.00	.19+00	.12+00	.11+00	1059.
	18:17:00	600	.21+02	.42+01	.21+01	.43+00	.43+00	.59-01	.00	.00	.18+00	.11+00	.90-01	803.
	18:27:00	600	.23+02	.44+01	.33+01	.47+00	.65+00	.15+00	.00	.00	.22+00	.15+00	.13+00	1301.
	18:37:00	600	.18+02	.43+01	.21+01	.29+00	.58+00	.20+00	.00	.00	.19+00	.13+00	.12+00	1298.
	18:47:00	600	.19+02	.41+01	.21+01	.32+00	.29+00	.77-01	.00	.00	.16+00	.98-01	.79-01	775.
	18:57:00	600	.17+02	.44+01	.15+01	.44+00	.63+00	.98-01	.00	.00	.17+00	.12+00	.11+00	968.
	19:07:00	600	.14+02	.32+01	.14+01	.35+00	.55+00	.93-01	.00	.00	.14+00	.10+00	.94-01	864.
	19:17:00	600	.12+02	.31+01	.16+01	.27+00	.29+00	.20-01	.00	.00	.11+00	.68-01	.55-01	445.
	19:27:00	600	.12+02	.27+01	.13+01	.32+00	.39+00	.12+00	.00	.00	.13+00	.94-01	.87-01	879.
	19:37:00	600	.12+02	.25+01	.12+01	.38+00	.34+00	.59-01	.00	.00	.12+00	.81-01	.72-01	659.
	19:47:00	600	.12+02	.25+01	.13+01	.24+00	.14+00	.93-01	.00	.00	.11+00	.75-01	.54-01	711.
	19:57:00	600	.12+02	.25+01	.13+01	.23+00	.43+00	.20-01	.00	.00	.10+00	.64-01	.57-01	429.
	20:07:00	600	.14+02	.36+01	.26+01	.52+00	.77+00	.33+00	.00	.00	.22+00	.18+00	.18+00	1842.

TABLE D1 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UGM**3)
17 MAR 77													
20:17:00	600	.77+01	.17+01	.94+00	.17+00	.19+00	.79-01	.00	.00	.81-01	.57-01	.52-01	586.
20:27:00	600	.56+01	.15+01	.11+01	.18+00	.43+00	.00	.00	.00	.66-01	.49-01	.45-01	266.
20:37:00	600	.59+01	.13+01	.76+00	.14+00	.24+00	.79-01	.00	.00	.73-01	.52-01	.50-01	516.
20:47:00	600	.66+01	.14+01	.85+00	.76-01	.48-01	.39-01	.00	.00	.55-01	.34-01	.26-01	294.
20:57:00	600	.62+01	.14+01	.61+00	.12+00	.19+00	.79-01	.00	.00	.68-01	.48-01	.46-01	499.
21:07:00	600	.70+01	.14+01	.10+01	.61-01	.96-01	.20-01	.00	.00	.54-01	.31-01	.23-01	220.
21:17:00	600	.65+01	.13+01	.99+00	.91-01	.29+00	.59-01	.00	.00	.59-01	.48-01	.45-01	427.
21:27:00	600	.54+01	.11+01	.43+00	.20+00	.14+00	.20-01	.00	.00	.51-01	.35-01	.32-01	278.
21:37:00	600	.45+01	.11+01	.59+00	.12+00	.49-01	.39-01	.00	.00	.46-01	.32-01	.27-01	297.
21:47:00	600	.52+01	.88+00	.58+00	.61-01	.19+00	.59-01	.00	.00	.53-01	.37-01	.36-01	371.
21:57:00	600	.49+01	.88+00	.37+00	.11+00	.95-01	.00	.00	.00	.37-01	.21-01	.17-01	139.
22:07:00	600	.58+01	.97+00	.46+00	.30-01	.96-01	.20-01	.00	.00	.41-01	.20-01	.17-01	176.
22:17:00	600	.22+01	.13+01	.85+00	.76-01	.19+00	.79-01	.00	.00	.51-01	.45-01	.43-01	451.
22:27:00	600	.63+01	.14+01	.58+00	.12+00	.96-01	.79-01	.00	.00	.64-01	.45-01	.43-01	480.
22:37:00	600	.55+01	.90+00	.47+00	.12+00	.00	.20-01	.00	.00	.42-01	.25-01	.19-01	209.
22:47:00	600	.57+01	.62+00	.46+00	.76-01	.19+00	.59-01	.00	.00	.53-01	.36-01	.36-01	376.
22:57:00	600	.40+01	.90+00	.46+00	.30-01	.49-01	.00	.00	.00	.32-01	.14-01	.76-02	82.
23:07:00	600	.43+01	.67+00	.55+00	.91-01	.48-01	.00	.00	.00	.32-01	.19-01	.14-01	110.
23:17:00	600	.51+01	.62+00	.33+00	.30-01	.14+00	.39-01	.00	.00	.42-01	.24-01	.24-01	254.
23:27:00	600	.53+01	.54+00	.30+00	.61-01	.48-01	.20-01	.00	.00	.35-01	.18-01	.16-01	172.
23:37:00	600	.51+01	.73+00	.33+00	.12+00	.95-01	.39-01	.00	.00	.46-01	.30-01	.28-01	293.
23:47:00	600	.38+01	.82+00	.46+00	.76-01	.48-01	.20-01	.00	.00	.33-01	.22-01	.17-01	178.
23:57:00	600	.39+01	.60+00	.37+00	.30-01	.95-01	.20-01	.00	.00	.31-01	.18-01	.16-01	157.
18 MAR 77													
0 : 7:00	600	.41+01	.56+00	.40+00	.61-01	.00	.00	.00	.00	.26-01	.13-01	.91-02	77.
0 :17:00	600	.35+01	.67+00	.18+00	.46-01	.00	.39-01	.00	.00	.30-01	.19-01	.16-01	222.
0 :27:00	600	.31+01	.34+00	.21+00	.46-01	.49-01	.00	.00	.00	.20-01	.99-02	.81-02	64.
0 :37:00	600	.24+01	.30+00	.12+00	.30-01	.00	.00	.00	.00	.14-01	.57-02	.38-02	40.
0 :47:00	600	.29+01	.32+00	.27+00	.46-01	.00	.20-01	.00	.00	.20-01	.13-01	.11-01	132.
0 :57:00	600	.53+01	.10+01	.76+00	.11+00	.14+00	.79-01	.00	.00	.61-01	.46-01	.43-01	474.
01:07:00	600	.73+01	.15+01	.70+00	.17+00	.19+00	.20-01	.00	.00	.63-01	.40-01	.35-01	294.
01:17:00	600	.34+01	.39+00	.30+00	.15-01	.96-01	.00	.00	.00	.23-01	.10-01	.91-02	62.
01:27:00	600	.29+01	.67+00	.21+00	.30-01	.11+00	.00	.00	.00	.21-01	.13-01	.12-01	76.
01:37:00	600	.56+01	.11+01	.33+00	.76-01	.96-01	.00	.00	.00	.39-01	.19-01	.15-01	120.
01:47:00	600	.72+01	.90+00	.61+00	.76-01	.95-01	.00	.00	.00	.46-01	.22-01	.17-01	134.
01:57:00	600	.67+01	.13+01	.55+00	.30-01	.48-01	.00	.00	.00	.42-01	.17-01	.11-01	101.
02:07:00	600	.45+01	.77+00	.24+00	.46-01	.49-01	.20-01	.00	.00	.32-01	.17-01	.15-01	161.
02:17:00	600	.41+01	.56+00	.30+00	.15-01	.96-01	.20-01	.00	.00	.30-01	.16-01	.15-01	148.
02:27:00	600	.51+01	.88+00	.64+00	.12+00	.95-01	.20-01	.00	.00	.46-01	.33-01	.25-01	229.
02:37:00	600	.52+01	.86+00	.55+00	.76-01	.96-01	.00	.00	.00	.37-01	.20-01	.16-01	119.
02:47:00	600	.54+01	.94+00	.59+00	.46-01	.49-01	.00	.00	.00	.35-01	.17-01	.11-01	94.
02:57:00	600	.73+01	.13+01	.55+00	.18+00	.00	.59-01	.00	.00	.63-01	.42-01	.35-01	421.

TABLE D1 (cont)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARKY SITE, WSMR

DATE TIME (MST)	SAMPLE TYPE (C)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
18 JAN 77													
03:07:00	600	.86+01	.13+01	.94+00	.91-01	.48-01	.59-01	.00	.00	.68-01	.41-01	.33-01	397.
03:17:00	600	.85+01	.15+01	.55+00	.11+00	.13+00	.57-01	.00	.00	.69-01	.41-01	.38-01	414.
03:27:00	600	.70+01	.10+01	.61+00	.14+00	.19+00	.59-01	.00	.00	.65-01	.44-01	.2-01	427.
03:37:00	600	.63+01	.11+01	.93+00	.91-01	.95-01	.23-01	.00	.00	.47-01	.25-01	.22-01	214.
03:47:00	600	.57+01	.69+00	.64+00	.14+00	.96-01	.20-01	.00	.00	.46-01	.30-01	.25-01	236.
03:57:00	600	.45+01	.68+00	.19+00	.30-01	.18+00	.13-01	.00	.00	.34-01	.15-01	.15-01	167.
04:07:00	600	.48+01	.73+00	.18+00	.46-01	.00	.39-01	.00	.00	.35-01	.19-01	.17-01	232.
04:17:00	600	.42+01	.97+00	.27+00	.12+00	.48-01	.23-01	.00	.00	.43-01	.24-01	.20-01	207.
04:27:00	600	.40+01	.60+00	.18+00	.61-01	.96-01	.00	.00	.00	.27-01	.14-01	.12-01	91.
04:37:00	600	.43+01	.79+00	.21+00	.15-01	.17+00	.00	.00	.00	.33-01	.14-01	.15-01	97.
04:47:00	600	.39+01	.60+00	.33+00	.30-01	.00	.39-01	.00	.00	.32-01	.19-01	.16-01	219.
04:57:00	600	.47+01	.79+00	.43+00	.46-01	.45-01	.00	.00	.00	.33-01	.14-01	.10-01	93.
05:07:00	600	.60+01	.84+00	.79+00	.93-01	.40-01	.00	.00	.00	.41-01	.23-01	.16-01	128.
05:17:00	600	.72+01	.14+01	.82+00	.23+00	.18+00	.31-01	.00	.00	.78-01	.57-01	.54-01	444.
05:27:00	600	.69+01	.18+01	.88+00	.17+00	.19+00	.00	.00	.00	.61-01	.38-01	.30-01	294.
05:37:00	600	.78+01	.13+01	.76+00	.61-01	.95-01	.23-01	.00	.00	.54-01	.29-01	.22-01	216.
05:47:00	600	.65+01	.17+01	.82+00	.76-01	.48-01	.20-01	.00	.00	.52-01	.30-01	.29-01	216.
05:57:00	600	.71+01	.13+01	.77+00	.76-01	.19+00	.77-01	.00	.00	.73-01	.47-01	.44-01	493.
06:07:00	600	.61+01	.13+01	.67+00	.61-01	.00	.39-01	.00	.00	.48-01	.28-01	.22-01	267.
06:17:00	600	.57+01	.12+01	.93+00	.71-01	.95-01	.47-01	.00	.00	.55-01	.35-01	.32-01	375.
06:27:00	600	.54+01	.13+01	.80+00	.11+00	.96-01	.00	.00	.00	.41-01	.22-01	.18-01	139.
06:37:00	600	.51+01	.94+00	.54+00	.71-01	.17+00	.23-01	.00	.00	.47-01	.33-01	.27-01	227.
06:47:00	600	.53+01	.90+00	.33+00	.76-01	.48-01	.00	.00	.00	.34-01	.16-01	.12-01	106.
06:57:00	600	.53+01	.10+01	.37+00	.15-01	.25+00	.00	.00	.00	.36-01	.15-01	.13-01	95.
07:07:00	600	.47+01	.10+01	.49+00	.76-01	.48-01	.20-01	.00	.00	.38-01	.23-01	.18-01	187.
07:17:00	600	.51+01	.11+01	.52+00	.46-01	.21+00	.37-01	.00	.00	.43-01	.32-01	.32-01	292.
07:27:00	600	.56+01	.69+00	.46+00	.76-01	.48-01	.00	.00	.00	.32-01	.17-01	.12-01	101.
07:37:00	600	.53+01	.88+00	.33+00	.46-01	.45-01	.00	.00	.00	.32-01	.14-01	.79-02	85.
07:47:00	600	.47+01	[illegible]	.33+00	.76-01	.00	.20-01	.00	.00	.35-01	.19-01	.15-01	174.
07:57:00	600	.42+01	[illegible]	.43+00	.61-01	.49-01	.23-01	[illegible]	.00	.33-01	.27-01	.16-01	170.
08:07:00	600	.43+01	.44+00	.33+00	.30-01	.24+00	.39-01	[illegible]	.00	.45-01	.30-01	.32-01	279.
08:17:00	600	.45+01	.71+00	.20+00	.15-01	.95-01	.00		.00	.27-01	.11-01	.76-02	73.
08:27:00	600	.39+01	.77+00	.19+00	.15-01	.48-01	.00	.00	.00	.23-01	.88-02	.66-02	57.
08:37:00	600	.41+01	.71+00	.46+00	.15-01	.00	.77-01	.00	.00	.41-01	.29-01	.26-01	377.
08:47:00	600	.36+01	.86+00	.18+00	.61-01	.96-01	.59-01	.00	.00	.40-01	.28-01	.28-01	333.
08:57:00	600	.35+01	.85+00	.24+00	.00	.45-01	.00	.00	.00	.23-01	.88-02	.60-02	50.
09:07:00	600	.34+01	.36+00	.40+00	.30-01	.14+00	.20-01	.00	.00	.30-01	.19-01	.18-01	161.
09:17:00	600	.31+01	.39+00	.24+00	.00	.96-01	.00	.00	.00	.23-01	.85-02	.77-02	49.
09:27:00	600	.31+01	.67+00	.37+00	.30-01	.96-01	.00	.00	.00	.24-01	.13-01	.11-01	73.
09:37:00	600	.32+01	.58+00	.24+00	.15-01	.49-01	.23-01	.00	.00	.25-01	.13-01	.12-01	137.
09:47:00	600	.27+01	.54+00	.30-01	.15-01	.00	.00	.00	.00	.15-01	.45-02	.27-02	34.

TABLE D1 (cont.)
PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING
ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
18 MAR 77														
	09:57:00	600	.11+01	.13+00	.00	.00	.00	.00	.00	.00	.49-02	.84-03	.50-03	9.
	10:07:30	600	.28+00	.19+00	.12+00	.15-01	.00	.00	.00	.00	.39-02	.33-02	.20-02	18.
	10:17:00	600	.28+00	.19+00	.91-01	.00	.96-01	.00	.00	.00	.66-02	.50-02	.59-02	25.
	10:27:30	600	.25+00	.13+00	.00	.00	.00	.00	.00	.00	.17-02	.51-03	.26-03	3.
	10:37:00	600	.17+00	.86-01	.91-01	.00	.00	.00	.00	.00	.19-02	.14-02	.61-03	4.
	10:47:30	600	.17+00	.64-01	.00	.00	.00	.00	.00	.00	.10-02	.30-03	.14-03	2.
	10:57:00	600	.17+00	.11+00	.91-01	.00	.00	.00	.00	.00	.20-02	.15-02	.65-03	5.
	11:07:30	600	.12+00	.13+00	.30-01	.00	.45-01	.00	.00	.00	.33-02	.24-02	.29-02	12.
	11:17:00	600	.15+00	.15+00	.61-01	.00	.00	.00	.00	.00	.19-02	.13-02	.55-03	4.
	11:27:30	600	.19+00	.64-01	.30-01	.00	.00	.00	.00	.00	.14-02	.63-03	.30-03	1.
	11:37:00	600	.19+00	.13+00	.35-01	.30-01	.48-01	.00	.00	.00	.52-02	.48-02	.50-02	30.
	11:47:30	600	.22+00	.15+00	.61-01	.00	.00	.00	.00	.00	.22-02	.13-02	.57-03	5.
	11:57:00	600	.27+00	.64-01	.91-01	.00	.00	.00	.00	.00	.22-02	.14-02	.61-03	5.
	12:07:30	600	.21+00	.11+00	.61-01	.15-01	.00	.00	.00	.00	.20-02	.23-02	.16-02	13.
	12:17:00	600	.15+00	.13+00	.12+00	.15-01	.48-01	.00	.00	.00	.50-02	.46-02	.44-02	23.
	12:27:30	600	.29+00	.43-01	.61-01	.15-01	.00	.00	.00	.00	.27-02	.21-02	.15-02	12.
	14:41:00	600	.24+01	.19+00	.00	.00	.00	.00	.00	.00	.11-01	.17-02	.44-03	19.
	14:51:30	600	.37+01	.36+00	.91-01	.15-01	.00	.00	.00	.00	.18-01	.50-02	.31-02	40.
	15:01:00	600	.41+00	.15+00	.61-01	.15-01	.00	.20-01	.00	.00	.80-02	.72-02	.69-02	95.
	15:11:30	600	.27+00	.17+00	.61-01	.15-01	.45-01	.00	.00	.00	.53-02	.47-02	.42-02	23.
	15:21:00	600	.28+00	.24+00	.91-01	.15-01	.00	.00	.00	.00	.40-02	.31-02	.19-02	16.
	15:31:30	600	.45+00	.11+00	.30-01	.13-01	.00	.00	.00	.00	.35-02	.21-02	.15-02	14.
	15:41:00	600	.42+00	.19+00	.00	.00	.48-01	.00	.00	.00	.46-02	.24-02	.29-02	14.
	15:51:30	600	.24+00	.13+00	.30-01	.00	.00	.00	.00	.00	.21-02	.91-03	.42-03	4.
	16:01:00	600	.36+00	.15+00	.30-01	.00	.00	.00	.00	.00	.25-02	.10-02	.47-03	5.
	16:11:30	600	.39+00	.11+00	.61-01	.00	.00	.00	.00	.00	.26-02	.12-02	.56-03	5.
	16:21:00	600	.64+00	.45+00	.61-01	.15-01	.48-01	.20-01	.00	.00	.12-01	.99-02	.99-02	109.
	16:31:30	600	.46+00	.28+00	.30-01	.30-01	.00	.00	.00	.00	.53-02	.39-02	.29-02	24.
	16:41:00	600	.52+00	.36+00	.15+00	.15-01	.96-01	.20-01	.00	.00	.14-01	.12-01	.13-01	[illegible]
	16:51:30	600	.52+00	.30+00	.12+00	.00	.00	.00	.00	.00	.47-02	.26-02	.12-02	[illegible]
	17:01:00	600	.50+00	.24+00	.91-01	.76-01	.00	.39-01	.00	.00	.17-01	.17-01	.17-01	212.
	17:11:30	600	.51+00	.32+00	.91-01	.30-01	.00	.23-01	.00	.00	.13-01	.93-02	.44-02	107.
	17:21:00	600	.70+00	.41+00	.21+00	.30-01	.48-01	.20-01	.00	.00	.15-01	.13-01	.12-01	121.
	17:31:30	600	.75+00	.58+00	.27+00	.30-01	.41-01	.00	.00	.00	.12-01	.90-02	.70-02	45.
	17:41:00	600	.88+00	.67+00	.30+00	.61-01	.00	.20-01	.00	.00	.17-01	.15-01	.12-01	136.
	17:51:30	600	.14+01	.32+00	.12+00	.00	.95-01	.31-01	.00	.00	.23-01	.15-01	.17-01	195.
	18:01:00	600	.47+01	.43+00	.12+00	.00	.96-01	.39-01	.00	.00	.34-01	.17-01	.18-01	219.
	18:11:30	600	.79+01	.75+00	.91-01	.30-01	.00	.23-01	.00	.00	.41-01	.14-01	.11-01	161.
	18:21:00	600	.11+02	.67+00	.46+00	.00	.48-01	.20-01	.00	.00	.54-01	.17-01	.14-01	177.
	18:31:30	600	.13+02	.11+01	.24+00	.30-01	.49-01	.57-01	.00	.00	.63-01	.28-01	.26-01	343.
	18:41:00	600	.88+01	.88+00	.33+00	.30-01	.40-01	.00	.00	.00	.45-01	.14-01	.10-01	103.

TABLE D1 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARMY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL								EXTINCTION (PER KM)			MASS LOADING (UG/M**3)
			1	2	3	4	5	6	7	8	1.06	3.8	10.6	
18 MAR 77														
	18:51:00	600	.83+01	.14+01	.92+00	.38-01	.48-01	.00	.00	.00	.48-01	.18-01	.12-01	112.
	19:01:00	600	.88+01	.84+00	.46+00	.76-01	.11+00	.23-01	.00	.00	.56-01	.27-01	.24-01	230.
	19:11:00	600	.80+01	.14+01	.58+00	.30-01	.14+00	.20-01	.00	.00	.55-01	.26-01	.22-01	209.
	19:21:00	600	.87+01	.13+01	.92+00	.71-01	.95-01	.00	.00	.00	.53-01	.24-01	.19-01	155.
	19:31:00	600	.90+01	.14+01	.98+00	.76-01	.24+00	.98-01	.00	.00	.82-01	.52-01	.52-01	581.
	19:41:00	600	.16+02	.32+01	.17+01	.21+00	.17+00	.52-01	.00	.00	.13+00	.73-01	.58-01	552.
	19:51:00	600	.90+01	.18+01	.98+00	.83+00	.88-01	.39-01	.00	.00	.72-01	.45-01	.37-01	393.
	20:01:00	600	.13+02	.20+01	.73+00	.11+00	.11+00	.31-01	.00	.00	.87-01	.42-01	.33-01	373.
	20:11:00	600	.86+01	.13+01	.80+00	.46-01	.96-01	.00	.00	.00	.50-01	.19-01	.15-01	127.
	20:21:00	600	.99+01	.17+01	.93+00	.11+00	.00	.31-01	.00	.00	.67-01	.28-01	.23-01	283.
	20:31:00	600	.87+01	.12+01	.10+01	.61-01	.96-01	.20-01	.00	.00	.60-01	.32-01	.24-01	230.
	20:41:00	600	.79+01	.19+01	.76+00	.91-01	.11+00	.23-01	.00	.00	.53-01	.33-01	.27-01	247.
	20:51:00	600	.99+01	.10+01	.40+00	.46-01	.18+00	.00	.00	.00	.38-01	.19-01	.16-01	112.
	21:01:00	600	.93+01	.89+00	.69+00	.61-01	.00	.00	.00	.00	.31-01	.15-01	.94-02	89.
	21:11:00	600	.86+01	.88+00	.46+00	.00	.96-01	.79-01	.00	.00	.47-01	.32-01	.31-01	392.
	21:21:00	600	.16+02	.31+01	.11+01	.23+00	.95-01	.91-01	.00	.00	.13+00	.77-01	.63-01	725.
	21:31:00	600	.11+02	.18+01	.94+00	.19+00	.96-01	.20-01	.00	.00	.77-01	.41-01	.31-01	301.
	21:41:00	600	.37+02	.99+01	.17+01	.27+00	.17+00	.73-01	.00	.00	.24+00	.10+00	.78-01	386.
	21:51:00	600	.12+02	.21+01	.76+00	.76-01	.14+00	.00	.00	.00	.73-01	.31-01	.23-01	193.
	22:01:00	600	.79+01	.10+01	.73+00	.76-01	.00	.31-01	.00	.00	.57-01	.31-01	.23-01	290.
	22:11:00	600	.99+01	.11+01	.58+00	.46-01	.14+00	.20-01	.00	.00	.48-01	.27-01	.25-01	209.
	22:21:00	600	.39+01	.58+00	.91-01	.00	.49-01	.00	.00	.00	.21-01	.52-02	.50-02	45.
	22:31:00	600	.26+01	.43+00	.18+00	.46-01	.48-01	.00	.00	.00	.18-01	.96-02	.79-02	61.
	22:41:00	600	.27+01	.49+00	.21+00	.61-01	.49-01	.00	.00	.00	.23-01	.12-01	.92-02	73.
	22:51:00	600	.23+01	.26+00	.15+00	.11+00	.00	.00	.00	.00	.18-01	.12-01	.90-02	82.
	23:01:00	600	.29+01	.39+00	.10+00	.00	.49-01	.23-01	.00	.00	.19-01	.11-01	.99-02	115.
	23:11:00	600	.27+01	.47+00	.17+00	.19-01	.48-01	.20-01	.00	.00	.21-01	.11-01	.11-01	125.
	23:21:00	600	.29+01	.43+00	.91-01	.00	.49-01	.00	.00	.00	.14-01	.91-02	.63-02	55.
	23:31:00	600	.21+01	.19+00	.12+00	.00	.14+00	.20-01	.00	.00	.20-01	.12-01	.14-01	127.
	23:41:00	600	.21+01	.39+00	.19+00	.19-01	.49-01	.37-01	.00	.00	.23-01	.15-01	.16-01	201.
	23:51:00	600	.23+01	.39+00	.91-01	.76-01	.00	.20-01	.00	.00	.20-01	.14-01	.12-01	145.
19 MAR 77														
	0:01:00	600	.20+01	.28+00	.12+00	.19-01	.00	.00	.00	.00	.11-01	.43-02	.26-02	28.
	0:11:00	600	.23+01	.33+00	.14+00	.33-01	.49-01	.23-01	.00	.00	.18-01	.12-01	.12-01	127.
	0:21:00	600	.18+01	.24+00	.21+00	.61-01	.48-01	.00	.00	.00	.15-01	.10-01	.86-02	63.
	0:31:00	600	.19+01	.21+00	.19+00	.46-01	.00	.00	.00	.00	.13-01	.71-02	.59-02	45.
20 MAR 77														
	12:45:00	900	.75+00	.31+00	.32+00	.13-01	.32-01	.13-01	.00	.00	.11-01	.83-02	.76-02	80.
	13:00:00	900	.13+01	.36+00	.24+00	.10-01	.00	.00	.00	.00	.95-02	.53-02	.28-02	24.
	13:15:00	900	.93+00	.29+00	.13+00	.13-01	.32-01	.17-01	.00	.00	.11-01	.71-02	.70-02	77.
	13:30:00	900	.20+01	.92+00	.32+00	.23-01	.60-01	.26-01	.72-01	.89-02	.45-01	.39-01	.38-01	1221.
	13:45:00	900	.93+00	.19+00	.22+00	.23-01	.00	.00	.00	.00	.81-02	.54-02	.31-02	26.
	14:00:00	900	.57+00	.27+00	.81-01	.10-01	.32-01	.00	.00	.00	.62-02	.39-02	.33-02	21.

TABLE D1 (cont)

PARTICULATE SIZE DISTRIBUTION, CALCULATED EXTINCTION, AND MASS LOADING

ARKY SITE, WSMR

DATE	TIME (MST)	SAMPLE TIME (SEC)	CHANNEL 1	2	3	4	5	6	7	8	EXTINCTION (PER KM) 1.06	3.8	10.6	MASS LOADING (UG/M**3)
27 MAR 77														
	14:15:00	900	.99+00	.53+00	.81-01	.30-01	.32-01	.00	.00	.00	.93-02	.59-02	.49-02	36.
	14:30:00	900	.55+00	.17+00	.20-01	.20-01	.00	.00	.00	.00	.44-02	.25-02	.19-02	19.
	14:45:00	900	.12+01	.37+00	.81-01	.00	.30-01	.00	.00	.00	.87-02	.38-02	.30-02	21.
	15:00:00	900	.17+01	.79+00	.19+00	.30-01	.95-01	.25-01	.00	.00	.24-01	.17-01	.17-01	169.
	15:15:00	900	.94+00	.24+00	.20-01	.61-01	.64-01	.13-01	.00	.00	.14-01	.11-01	.12-01	110.
	15:30:00	900	.10+01	.37+00	.14+00	.50-01	.61-01	.00	.00	.00	.11-01	.78-02	.70-02	44.
	15:45:00	900	.87+00	.40+00	.10+00	.30-01	.32-01	.00	.00	.00	.94-02	.63-02	.51-02	36.
	16:00:00	900	.75+00	.31+00	.91-01	.20-01	.32-01	.00	.00	.00	.78-02	.53-02	.41-02	29.
	16:15:00	900	.98+00	.24+00	.14+00	.10-01	.32-01	.00	.00	.00	.81-02	.47-02	.37-02	25.
	16:30:00	900	.13+01	.47+00	.14+00	.40-01	.61-01	.13-01	.00	.00	.16-01	.12-01	.11-01	106.
	16:45:00	900	.16+01	.63+00	.28+00	.40-01	.64-01	.00	.00	.00	.17-01	.11-01	.09-02	60.
	17:00:00	900	.14+01	.75+00	.19+00	.40-01	.32-01	.25-01	.00	.00	.23-01	.15-01	.14-01	149.
	17:15:00	900	.11+01	.43+00	.10+00	.30-01	.32-01	.39-01	.00	.00	.19-01	.16-01	.16-01	199.
	17:30:00	900	.11+01	.44+00	.16+00	.51-01	.00	.52-01	.00	.00	.22-01	.20-01	.19-01	260.
	17:45:00	900	.72+00	.30+00	.14+00	.10-01	.00	.26-01	.00	.00	.12-01	.99-02	.90-02	129.
	18:00:00	900	.11+01	.60+00	.19+00	.40-01	.00	.00	.00	.00	.11-01	.77-02	.45-02	42.
	18:15:00	900	.12+01	.53+00	.22+00	.51-01	.64-01	.00	.00	.00	.15-01	.11-01	.90-02	61.
	18:30:00	900	.10+01	.41+00	.61-01	.40-01	.95-01	.11-01	.00	.00	.15-01	.12-01	.13-01	109.
	18:45:00	900	.87+00	.43+00	.22+00	.40-01	.00	.30-01	.00	.00	.18-01	.17-01	.15-01	200.
	19:00:00	900	.85+00	.26+00	.13+00	.61-01	.61-01	.11-01	.00	.00	.15-01	.13-01	.13-01	113.
	19:15:00	900	.17+01	.74+00	.32+00	.60-01	.64-01	.26-01	.00	.00	.24-01	.18-01	.16-01	170.
	19:30:00	900	.91+00	.54+00	.29+00	.51-01	.13+00	.11-01	.00	.00	.23-01	.17-01	.16-01	126.
	19:45:00	900	.11+01	.39+00	.18+00	.40-01	.00	.13-01	.00	.00	.13-01	.10-01	.80-02	92.
	20:00:00	900	.94+00	.46+00	.19+00	.30-01	.00	.11-01	.00	.00	.12-01	.93-02	.74-02	87.
	20:15:00	900	.10+01	.49+00	.31+00	.10-01	.32-01	.00	.00	.00	.11-01	.74-02	.49-02	32.
	20:30:00	900	.10+01	.44+00	.19+00	.20-01	.61-01	.77-01	.00	.00	.28-01	.25-01	.28-01	362.
	20:45:00	900	.96+00	.51+00	.14+00	.30-01	.32-01	.13-01	.00	.00	.14-01	.10-01	.90-02	93.
	21:00:00	900	.10+01	.41+00	.22+00	.10-01	.00	.00	.00	.00	.86-02	.52-02	.27-02	23.
	21:15:00	900	.96+00	.29+00	.24+00	.20-01	.32-01	.26-01	.00	.00	.15-01	.13-01	.12-01	140.
	21:30:00	900	.90+00	.34+00	.91-01	.20-01	.00	.37-01	.00	.00	.16-01	.13-01	.13-01	194.
	21:45:00	900	.94+00	.47+00	.20+00	.30-01	.64-01	.00	.00	.00	.13-01	.97-02	.78-02	48.
	22:00:00	900	.11+01	.43+00	.16+00	.50-01	.95-01	.00	.00	.00	.14-01	.10-01	.76-02	57.
	22:15:00	900	.11+01	.54+00	.20+00	.40-01	.32-01	.00	.00	.00	.13-01	.99-02	.70-02	50.
	22:30:00	900	.13+01	.56+00	.32+00	.00	.65-01	.13-01	.00	.00	.15-01	.11-01	.96-02	87.
	22:45:00	900	.94+00	.47+00	.20+00	.51-01	.64-01	.13-01	.00	.00	.16-01	.13-01	.12-01	111.
	23:00:00	900	.24+01	.46+00	.14+00	.30-01	.61-01	.00	.00	.00	.17-01	.85-02	.75-02	54.
	23:15:00	900	.58+01	.57+00	.22+00	.61-01	.32-01	.13-01	.00	.00	.35-01	.16-01	.13-01	145.
	23:30:00	900	.66+01	.31+00	.19+00	.20-01	.00	.00	.00	.00	.53-01	.74-02	.46-02	63.
	23:45:00	900	.91+01	.56+00	.16+00	.71-01	.96-01	.13-01	.00	.00	.50-01	.19-01	.18-01	183.

SUPPLEMENTARY

INFORMATION

ERRATA SHEET

ASL DR-0001
ATMOSPHERIC CONDITIONS AT THE HIGH ENERGY
LASER SYSTEMS TEST FACILITY (HELSTF),
WHITE SANDS MISSILE RANGE (WSMR), NEW MEXICO
24 MARCH TO 8 APRIL 1977

Insert table 12 as page 19a of the report.

TABLE 12. NOAA TURBULENCE FLIGHTS

Date		Time (MST)			
		0000	0500	1200	1800
March	24	N	N	N	N
	25	N	C	P	C
	26	C	N	P	N
	27	C	C	N	N
	28	N	N	C	C
	29	C	C	C	C
	30	C	C	C	C
	31	C	C	C	C
April	1	N	N	C	C
	2	C	N	C	C
	3	C	C	P	P
	4	N	C	C	C
	5	C	N	N	N
	6	N	N	N	N
	7	N	N	N	N
	8	N	N	N	N

C = Complete data set

P = Partial data set

N = No data